Journal of the Royal Society of Arts

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DEATH OF SIR JOHN SIMONSEN

[*Photograph by Walter Stoneman*

It is with deep regret that we record the death, on 20th February, in London, of Sir John Simonsen, a Member of Council of the Society since 1949.

Sir John Lionel Simonsen, D.Sc., LL.D., F.R.I.C., F.R.S., was born in 1884, and was educated at Manchester Grammar School and University. After having

held both a research fellowship and a lectureship there, he was appointed in 1910 to the Chair of Chemistry at the Presidency College, Madras, from which time he was concerned with the chemistry of plant products. During his career in India, he was from 1914 to 1926 Honorary Secretary of the Indian Science Congress, and president both of the section of chemistry and of the congress, while during the First World War he served as Controller of Oils and Chemical Adviser to the Indian Munitions Board. Later, Dr. Simonsen, as he then was, became Forest Chemist at the Forest Research Institute and College, Dehra Dun, and in 1925 was appointed Professor of Organic Chemistry in the Indian Institute of Sciences, Bangalore, where he remained for two years.

During his work at Dehra Dun he did some of his most original research as a chemist, extracting and identifying from Indian pines and grasses the first naturally-occurring representatives of new complex hydrocarbons. In 1931 after his return to Britain, where he took up the Chair of Chemistry at the College of North Wales, Bangor, he published an authoritative treatise on *The Terpenes*, and he had contributed a number of papers to the Proceedings and Transactions of the Chemical Society at various times. In 1932 he was elected to the Fellowship of the Royal Society.

In 1943, having left Bangor in the previous year, he was appointed first Director of Colonial Products Research, for which his experience made him the natural choice, and he remained in that position until 1952. He realized that colonial territories were no longer to be regarded solely as primary producers, and looked to plant products, particularly sugar, as the raw materials of chemical industry. His enthusiasm over the possibilities of colonial microbiology was also considerable, and a visit which he paid in 1944, with Sir Robert Robinson, to the Caribbean, was mainly responsible for the decision to establish in Trinidad a Microbiological Research Institute. From 1945 to 1949 he was both Secretary of the Chemical Society and a member of the Agricultural Research Council, and in 1947 he presided over the Section of Chemistry at the British Association meeting. Among the many honours he received were the Royal Society's Davy Medal and the Fritzsche Award of the American Chemical Society. He was knighted in 1949.

Sir John took the Chair at meetings of the Society on a number of occasions. He was elected a Fellow of the Society in 1943.

Sir Harry Lindsay writes as follows:

> I first met John Simonsen and his wife Janet at Dehra Dun in 1920; our friendship was founded upon a joint interest in the future of the Indian lac industry and was cemented when Mrs. Simonsen's (as she then was) medical skill diagnosed an attack of influenza-*cum*-pneumonia, from which I was suffering when I joined them—a poor introduction to their hospitable home! However, they and the civil surgeon saw me through, and it is no exaggeration to say that I owe my life to their skill and care.
>
> My wife and I renewed the friendship during a visit to Bangor, and later again in London during the war, when Simonsen joined the Colonial Office as Director of Colonial Products Research; in that same year (1943) he became a Fellow of the Royal Society of Arts. I was always greatly struck by his wide

experience, which went far beyond the academic studies mentioned in the obituary notice printed above. His mind was shrewd and penetrating; although primarily a chemist, he was also a sound administrator; and he had a heart, as many of his former students will testify, and others whose needs were known to him.

A character both capable and lovable has passed to its rest, and the deep sympathy of his many friends, not only of the Royal Society of Arts, but of the other Societies in which he was interested, will go out to his widow in her loss.

H. A. F. L.

FORTHCOMING MEETINGS

MONDAY, 4TH MARCH, at 6 p.m. The last of three CANTOR LECTURES on '*The Contribution of Lighting to Modern Life*', entitled '*Lighting in Decoration and Architecture*', by D. W. Durrant. (The lecture will be illustrated with lantern slides and demonstrations.)

WEDNESDAY, 6TH MARCH, at 2.30 p.m. FERNHURST LECTURE. '*Trace Elements in Plant Nutrition: with special reference to crops*', by T. Wallace, C.B.E.,M.C., D.Sc., F.R.I.C., V.M.H., F.R.S., Professor of Horticultural Chemistry, University of Bristol, and Director, Long Ashton Research Station. Sir William Slater, K.B.E., D.Sc., F.R.I.C., Secretary, Agricultural Research Council, will preside. (The lecture will be illustrated by lantern slides.)

THURSDAY, 7TH MARCH, at 5.15 p.m. COMMONWEALTH SECTION. '*The Arts in Australia*', by D. J. Finley, Films and Exhibitions Officer, Office of the High Commissioner for Australia in London. Kenneth G. Bradley, C.M.G., Director of the Imperial Institute, will preside. (Tea will be served from 4.30 p.m.)

WEDNESDAY, 13TH MARCH, at 2.30 p.m. '*The Air Training Corps—its History and Place in Contemporary Society*', by Wing Commander Norman Macmillan, O.B.E., M.C., A.F.C., D.L., A.F.R.Ae.S.C. Ian Orr-Ewing, O.B.E., M.P., Parliamentary Under-Secretary of State, Air Ministry, will preside. (The lecture will be illustrated by lantern slides.)

WEDNESDAY, 20TH MARCH, at 2.30 p.m. '*Plumbing*', by G. L. Ackers, O.B.E., M.I.C.E., M.I.Struct.E., Chief Sanitary Engineer, Ministry of Works. Nigel Hannen, B.A., F.I.O.B., President, National Federation of Building Trades Employers, will preside. (The Paper will be illustrated with lantern slides.)

WEDNESDAY, 27TH MARCH, at 2.30 p.m. '*London Airport*', by Sir Alfred Le Maitre, K.B.E., C.B., M.C., Controller of Ground Services, Ministry of Transport and Civil Aviation. Air Marshal Sir John D'Albiac, K.C.V.O., K.B.E., C.B., D.S.O., lately Commandant, London Airport, will preside.

WEDNESDAY, 27TH MARCH, at 7.30 p.m. FILM EVENING. The programme will include (i) *Point of New Departure;* (ii) *Song of the Clouds*, and (iii) *Gold*. (Full details will be published in the next issue of the *Journal*.)

THURSDAY, 28TH MARCH, at 5.15 p.m. '*The West Indian Federation*', by Sir Hilary Blood, G.B.E., K.C.M.G., lately Governor and Commander-in-Chief, Mauritius. (Tea will be served from 4.30 p.m.)

Fellows are entitled to attend any of the Society's meetings without tickets (except where otherwise stated), and may also bring two guests. When they cannot accompany their guests, Fellows may give them special passes, books of which can be obtained on application to the Secretary.

INCREASE IN SUBSCRIPTION

A Special General Meeting of the Society has voted that the annual subscription payable by all Fellows shall from Ladyday next be Four Guineas. This change will, of course, affect only Fellows elected before 9th July, 1952.

A report of the proceedings of the meeting is published below.

SPECIAL GENERAL MEETING

A Special General Meeting was held on Tuesday, 12th February, 1957, at 4 p.m., at the Society's House, in accordance with the Bye-Laws, for the purpose of amending Bye-Laws 50 and 51. Dr. R. W. Holland, O.B.E., Chairman of Council of the Society, was in the chair.

The Secretary read the Notice convening the meeting and proved that it had been duly exhibited and published, as required by the Bye-Laws, after which the Chairman spoke as follows:

THE CHAIRMAN: The following is the proposed amendment to Bye-Laws 50 and 51 as approved by the Society's solicitors for submission to this meeting:

> Bye-Law 50. The Annual Subscription of every Member shall, subject to the right of compounding hereafter referred to, be Four Guineas, payable for each year of Membership at its commencement, such commencement to be reckoned from the quarter-day nearest to the day of election or admission. After the ninth day of July, 1952, each Member shall on election pay a registration fee of Two Guineas. [That is from the old rule.]
>
> Bye-Law 51. Any Member may commute or compound for all future payments of his annual subscription, by payment of a sum of not less than Forty Guineas.

THE CHAIRMAN *then called upon Mr. Le Neve Foster, the Senior Treasurer.*

MR. LE NEVE FOSTER (Senior Treasurer of the Society): At present there are two rates of subscription payable. There is the Three Guinea rate for Members elected before 9th July, 1952, and the Four Guinea subscription for Members who were elected after that date. All Members, regardless of the rate of subscription they pay, are entitled to exactly the same benefits from the Society: to receive the *Journal*, to use the Library, to use the Society's House, and to the services of the staff, and so on.

Quite obviously the present arrangement is extremely unfair, particularly

unfair, of course, to the new Members who pay at the higher rate. The lower rate of subscription was fixed in 1920, when the cost of running the Society was very much less than it is now. In fact, I think it is a very considerable achievement on the part of my predecessors as Treasurers to have managed to peg the subscription rate to the Society to as low a figure as Three Guineas for some 36 years. The subscription to this Society is, incidentally, considerably lower than is the subscription to some of the other learned societies.

The present position is that the cost of running the Society is going up every year, as no doubt you will have noticed for yourselves if you looked at the annual published accounts. If we are going to be reasonably certain of having a surplus of income over expenditure in future years we must have more income than we have at present. If this Society is going to expand, and if it is going to fulfil its traditional function of calling conferences and giving a platform to new ideas and so on, it is very necessary that we should have funds available each year for these purposes.

The view of both the Treasurers is that we ought now to put all Members on the same footing and level the annual subscription up to Four Guineas a year for everybody, partly to redress the present position, which is rather an unfair one, and partly because the Society may very well need more money in the course of the next few years.

THE CHAIRMAN *then asked for comments or questions on the statement.*

MR. A. M. FITZPATRICK-ROBERTSON: I have no objection whatsoever to the annual subscription being raised to Four Guineas for everybody, in so far as past and present Members are concerned, nor have I any objection whatsoever to the composition being increased to Forty Guineas. It does, however, strike me as being somewhat inequitable that those Members who were elected in previous years and paid the composition of Thirty Guineas, should be left as before when the old Members who have been paying Three Guineas a year are now compelled to pay Four Guineas.

THE CHAIRMAN: I have every sympathy, and I think Members of the Society would have every sympathy, with that expression of opinion, but there is a slight difference between the Member who has received his membership by compounding originally on a contract of composition, and the Member who has undertaken the payment of an annual subscription, which by alteration of the Bye-Laws can be changed. We cannot, by altering the Bye-Laws, inflict on a Member who is a Life Fellow an increase on the sum already paid; we cannot change that contractual arrangement without his consent. If he offers another Ten Guineas we will accept it, but there are two distinct legal positions, one of which can be altered by Bye-Law, the other cannot. We can alter by Bye-Law the compounding for future members, but not for those who have already compounded.

MR. A. M. FITZPATRICK-ROBERTSON: I accept what you say, but I must submit that it is inequitable.

MR. A. C. CHAPPELOW: I am a little surprised that this should be put to an ordinary vote. There does not seem to me to be anything we can do, apparently the notice has been very short.

THE CHAIRMAN: Our Bye-Laws provide that there can be no meeting of the Society unless ten persons are present, and there *are* ten persons present. If our Members are not sufficiently interested, their vote goes by default, and those here have the right to say whether this proposal shall be passed.

MR. A. C. CHAPPELOW: There are two learned Societies who have recently rejected this idea of increasing old subscriptions, one on principle. I think the principle is bad myself, certainly it is if it can be passed by a few Members only out of some 6,000! After all, a lot of the Members live in different parts of the world and cannot get here.

THE CHAIRMAN: We can, as a Council, only carry out the regulations contained in our Bye-Laws, which provide that appropriate advertisement in our *Journal*, which is sent to every Member, should be made, and if they are desirous of voting either for or against specifically, they would be here.

MR. A. C. CHAPPELOW: It is a very bad thing, is it not, that there are so few people here?

SIR HAROLD SAUNDERS, F.C.G.I. (a Member of Council of the Society): May I ask whether the Secretary has had any objection from Members who were unable to come to-day?

THE SECRETARY: No, Sir.

MR. D. J. AVERY: Though I support the Council in this amendment, I feel certain that many of these Members of the Society who will be affected by the change would like to come here but are prevented by the meeting being held at 4 o'clock in the afternoon. If it had been held one or two hours later there would have been a far better attendance. I do think the Council is at fault in that.

MR. A. M. FITZPATRICK-ROBERTSON: It does strike me that if due notice is given and Members do not turn up, it is entirely and definitely their own fault, although I can have a certain opinion which may be the opinion of the minority. I am not going to blame anybody for what may happen just because we are a small meeting. Due notice has been given, and if people are too lethargic or too uninterested to turn up, well, we have got to stand by that.

THE CHAIRMAN *then put to the meeting that the new Bye-Laws to take the place of the present Bye-Laws* 50 *and* 51 *should be adopted. The motion was carried by a majority of* 18 *to one.*

A statement was then made by THE CHAIRMAN *regarding a possible extension to the Society's premises, after which the meeting ended, and tea was served in the Library.*

THE ALBERT MEDAL

The Council are now considering the award of the Albert Medal of the Royal Society of Arts for 1957. They therefore invite Fellows of the Society to forward to the Secretary as soon as possible the names of such men of high distinction as they think worthy of this honour. The Medal was struck to reward 'distinguished merit in promoting the Arts, Manufactures and Commerce'. A list of previous recipients appeared in the last issue of the *Journal*.

MEETING OF COUNCIL

A meeting of Council was held on Monday, 11th February, 1957. Present: Dr. R. W. Holland (in the Chair); Mrs. Mary Adams; Dr. W. Greenhouse Allt; Sir Alfred Bossom; Sir Edward Crowe; Mr. Robin Darwin; Mr. P. A. Le Neve Foster; Sir Ernest Goodale; Mr. John Gloag; Mr. Milner Gray; Sir William Halcrow; The Earl of Halsbury; Mr. William Johnstone; Lord Latham; Mr. F. A. Mercer; Mr. Oswald P. Milne; Lord Nathan; Sir William Ogg; The Earl of Radnor; Sir Harold Saunders; Professor Dudley Stamp; Sir Stephen Tallents; Mr. G. E. Tonge; Sir Griffith Williams and Miss Anna Zinkeisen; with Mr. K. W. Luckhurst (Secretary), Mr. R. V. C. Cleveland-Stevens (Deputy Secretary) and Mr. David Lea (Assistant Secretary).

ELECTIONS

The following candidates were duly elected Fellows of the Society:

Adams, Maurice Edward, O.B.E., M.I.C.E., Burnham, Bucks.
Alison, Archibald, M.I.Mech.E., London.
Austin, Frank, J.P., London.
Baker, Humphrey George Ambrose, O.B.E., M.A., Sidmouth, Devon.
Barrett, Lieut.-Commander Denis Hugh Bryan, D.S.C., R.N.(retd.), London.
Bell, David Wilson, B.A., F.I.L., Stanley, Co. Durham.
Bettesworth, Richard Anthony, B.Sc., Rickmansworth, Herts.
Bloomberg, David, Cape Town, South Africa.
Bridges, John Gourlay, O.B.E., Bromley, Kent.
Burrows, Roy, Bunbury, Cheshire.
Curtis, Frederick Francis Charles, Dr. Ing., A.R.I.B.A., London.
de Majo, Willy Maks, M.B.E., F.S.I.A., London.
Dunwell, Wilfrid, B.A., Mus.Bac., Ph.D., Amersham, Bucks.
Forster, Samuel Alexander Sadler, C.B.E., Newcastle-upon-Tyne.
Foster, Alan Bertram, A.R.I.B.A., London.
Goodfield, Ephraim Edward, B.Sc., Norwich, Norfolk.
Green, Ivan William, Whitstable, Kent.
Grey, John, F.R.I.B.A., London.
Gupta, Ved Prakash, M.A., M.Com., LL.B., Delhi, India.
Harris, Frederick Camsell, F.R.I.C.S., Cape Town, South Africa.
Heap, Desmond, LL.M., P.P.T.P.I., London.
Hinge, David Gerald Francis, Wembley Park, Middx.

Hutchinson, Sir Geoffrey Clegg, M.C., T.D., Q.C., London.
Jackson, Edward William, A.I.E.E., Coryton, Essex.
Latham, James Douglas, Brentwood, Essex.
Le Fevre, Edwin John, B.Sc., M.I.Mech.E., Wh.Sch., Glasgow.
Looker, Harry William, Bromley, Kent.
Maunsell, Brigadier Raymund John, C.B.E., London.
Neuman, Alfred Abram Moses, Montreal, Quebec, Canada.
Plummer, Leslie Alfred Derek, London.
Sandison, James John, M.A., Ramsgate, Kent.
Serocold, Walter Pearce, D.S.O., T.D., London.
Strafford, Frederick Richmond Wentworth, M.I.E.E., Waltham Abbey, Essex.
Thorn, John Stephen, Southall, Middx.
Vignoles, Charles Malcolm, O.B.E., M.A., Chobham, Surrey.
Wiggins, Sydney Frederick, London.
Williamson, Mrs. Anne Marshall, Belfast, Northern Ireland.
Wilson, Douglas Francis, Stockton-on-Tees, Co. Durham.
Woods, David William Press, Belfast, Northern Ireland.
Young, Eric Rutherford, B.Sc., F.R.I.C.S., F.A.I., Cuckfield, Sussex.

The following were elected Associate Members:

Boag, Julian David Walter, Reigate, Surrey.
Winship, Edwin Neasham, Newcastle-upon-Tyne.

RESIGNATIONS OF DEPUTY SECRETARY AND ASSISTANT SECRETARY

The Chairman announced with regret that Mr. R. V. C. Cleveland-Stevens, the Deputy Secretary, would be leaving the Society's service in April in order to take up a business appointment. The Chairman also mentioned with regret that Mr. David Lea, the Assistant Secretary, would be leaving in June.

INDUSTRIAL ART BURSARIES COMPETITIONS

The recommendations made by the Industrial Art Bursaries Board with regard to the Competition held in 1956 and the arrangements for a Competition in 1957 were adopted (see separate notice).

ALBERT MEDAL

Preliminary consideration was given to the 1957 award.

UNITED KINGDOM COMMITTEE OF THE WORLD HEALTH ORGANIZATION

Sir Selwyn Selwyn-Clarke was appointed as the Society's representative on the United Kingdom Committee of the World Health Organization.

OTHER BUSINESS

A quantity of financial and other business was transacted.

INDUSTRIAL ART BURSARIES COMPETITIONS

1956 COMPETITION

At the request of the Council, the Industrial Art Bursaries Board again organized a competition in 1956, and Bursaries, usually of £150, were offered in 17 different sections. These covered the following subjects: acrylic sheet ('Perspex'); carpets; cinema and television settings; domestic electrical appliances; domestic glassware; domestic solid-fuel-burning appliances; dress textiles; electric-light fittings; footwear; furnishing textiles; furniture; jewellery; laminated plastics; P.V.C. plastics sheeting; pottery; wall-paper, and women's fashion wear (in this section two awards of £200 and £150 respectively were offered under the Bianca Mosca Memorial Trust). The Sir Frank Warner Memorial Medal was also offered for the best design in the carpet, dress textiles, and furnishing textiles sections.

The competition was open* to full-time or part-time students, between the ages of 17 and thirty, of art, architectural, technical or other colleges or schools approved by the Society, and in certain sections eligibility was extended to include young draughtsmen, clerks or other similar persons engaged in industry, whether or not they had had any previous art school training, provided that they were recommended as having sufficient ability to compete in a national competition by a responsible officer of the industry concerned. In all, 412 candidates from seventy schools and industrial establishments entered the competition; this compares with 330 candidates in 1955, 292 in 1954, and 232 in 1953, in which years the numbers of schools and industrial establishments represented were 66, 63 and sixty respectively.

Candidates were required both to undergo a set test, carried out under invigilation, and also to submit examples of work, chosen from the work done by them in the ordinary course of their studies.

As in the past the Council's purpose in arranging the competition was to enable successful candidates to broaden their knowledge and experience by travel abroad and the study of foreign design, or in certain cases to obtain art training or industrial experience in this country. The success of the tours made by Bursary winners depends largely upon their meeting manufacturers and industrial designers in the countries visited and, in past years, many people in this country have kindly given assistance by providing helpful introductions. In this connection the Bursaries Board would be grateful to hear from Fellows who may be able to provide help to these students when abroad.

The Council desire to express their thanks to all those who have assisted and advised on the conduct of the competitions, particularly the firms, organizations and individuals who generously subscribed towards the cost of the Bursaries, the Juries for their voluntary services, and the heads of organizations submitting candidates for their co-operation.

* Special conditions applied to the women's fashion section.

Awards

The Council, adopting the recommendations of the Industrial Art Bursaries Board based on the reports of the Juries, have awarded 24 Bursaries amounting in value to £3,050. The following awards and Commendations have been made in connection with 16 of the 17 sections included in the competition. No award was made in the jewellery section.

DOMESTIC ELECTRICAL APPLIANCES

Bursary (£150): *Mr. D. L. Morgan** (Kingston School of Art: age 17)

Commended: Mr. G. T. Church (Birmingham College of Art and Crafts: age 19); *Mr. A. R. Copp* (L.C.C. Central School of Arts and Crafts: age 19)

ELECTRIC LIGHT FITTINGS

Bursary (£150): *Mr. B. Sams* (Birmingham College of Art and Crafts: age 25)

DOMESTIC SOLID FUEL-BURNING APPLIANCES

Bursary (£150): *Mr. D. J. Keepax** (Birmingham College of Art and Crafts: age 19)

Commended: Mr. J. D. Payne (Birmingham College of Art and Crafts: age 22)

CARPETS

Bursaries: Mr. D. J. Parsons (Messrs. John Crossley & Sons, Ltd.; formerly at Eastbourne School of Art: age 23) and *Miss J. Tee* (Messrs. John Crossley & Sons, Ltd.; formerly at the L.C.C. Central School of Arts and Crafts: age 23); £75 *each*

Commended: Mr. R. S. Varndell (Royal Technical College, School of Art, Salford: age 18); *Mr. J. H. Walton* (Kidderminster College of Further Education: age 17)

DRESS TEXTILES

*Bursaries: Miss D. Dyall** (Royal College of Art: age 19) £150; *Miss V. M. Carr* (Royal College of Art: age 23) and *Miss D. E. Littler* (Brighton College of Art and Crafts: age 22) £75 *each*

Commended: Miss E. Toll (Blackpool Technical College and School of Art: age 18)

FURNISHING TEXTILES

Bursary (£150): *Miss H. E. A. Porter** (Carlisle College of Art: age 18)

Commended: Miss J. P. M. Andrews (Carlisle College of Art: age 20); *Mr. D. J. R. Hollingum* (Gravesend School of Art and Crafts: age 18); *Mr. D. C. Saunders* (Royal College of Art: age 25)

* Also awarded Associate Membership of the Society.

WOMEN'S FASHION WEAR

*Bianca Mosca Awards: Miss E. J. Allen** (L.C.C. Hammersmith School of Building and Arts and Crafts: age 19) £200; *Miss M. A. Thorpe* (Royal College of Art: age 22) £150

Commended: Miss J. M. Checkley (Harrow Technical College and School of Art: age 18); *Miss R. A. Grima* (Royal College of Art: age 22); *Miss H. Marshall* (Kingston-upon-Hull Regional College of Art and Crafts: age 20); *Miss S. E. Rose* (Brighton College of Art and Crafts: age 17)

ACRYLIC SHEET ('PERSPEX')

Bursary (£150): *Miss J. M. Timmis** (L.C.C. Central School of Arts and Crafts: age 19)

Commended: Mr. A. C. Oliver (Birmingham College of Art and Crafts: age 18); *Mr. R. D. Whiteside* (Royal College of Art: age 24)

LAMINATED PLASTICS

*Bursaries: Miss O. D. Fletcher** (Carlisle College of Art: age 20) and *Mr. P. C. Jackson* (Falmouth School of Art: age 23) £75 *each*

Commended: Mr. V. Rossi (Edinburgh College of Art: age 22); *Mr. J. B.* Sampson (Poole College for Further Education: age 20)

P.V.C. PLASTICS SHEETING

Bursary (£150): *Mr. B. Jay** (Kingston School of Art: age 18)

Commended: Miss M. G. Evans (Falmouth School of Art: age 19)

CINEMA AND TELEVISION SETTINGS

Bursaries: Mr. S. G. Morris (Royal College of Art: age 26) and *Mr. M. L. C. Goulding*, Des.R.C.A. (The Design Department of the British Broadcasting Corporation's Television Centre; formerly of the Royal College of Art: age 26) £150 *each*

Commended: Mr. M. J. A. Wield (The Design Department of Associated Rediffusion, Ltd: age 25); *Mr. J. C. Wilford* (Birmingham College of Art and Crafts: age 21)

DOMESTIC GLASSWARE

Bursary (£150): *Mr. J. N. Ritchie* (Kingston School of Art: age 23)

Commended: Mr. D. W. Hammond (Royal College of Art: age 25)

FOOTWEAR

Bursary (£150): *Miss S. P. Curtis** (Leicester Colleges of Art and Technology: age 18)

Commended: Miss D. E. Alton (Leicester College of Art: age 20); *Miss S. P. Miller* (Royal College of Art: age 20); *Miss W. J. Green* (Leicester College of Art: age 17); *Miss J. Harris* (West Sussex College of Arts and Crafts: age 18)

* Also awarded Associate Membership of the Society.

FURNITURE

*Bursaries : Mr. J. C. Bate** (Birmingham College of Art and Crafts: age 18) and *Mr. R. R. Bennett* (High Wycombe College of Further Education: age 24) £150 *each*; *Mr. T. O'B. Kennedy** (High Wycombe College of Further Education: age 20) and *Mr. M. J. C. Knott* (Royal College of Art: age 22) £75 *each*

Commended: Mr. P. B. Banning (West of England College of Art: age 22); *Mr. B. Metheringham* (Mansfield School of Art: age 19); *Mr. J. D. A. Tucker* (High Wycombe College of Further Education: age 19)

POTTERY

Commended: Mr. J. G. Skinner (Birmingham College of Art and Crafts: age 24)

WALL-PAPER

Bursary (£150): *Miss H. E. A. Porter** (Carlisle College of Art: age 18)

Commended: Miss B. M. Gregson (Royal College of Art: age 20)

The Sir Frank Warner Memorial Medal: Miss J. Tee (Messrs. John Crossley & Sons, Ltd.; formerly at the L.C.C. Central School of Arts and Crafts: age 23)

Publication of Report

Full details of the 1956 competition will be contained in the annual report on the competition which will be published, together with the particulars of the next competition, in May. This report will contain particulars of the tests set in each section, the names of the winning and commended candidates, the reports and composition of the Juries, and a summary of the uses made of Bursaries in 1956 by previous Bursary winners. Illustrations of many of the winning designs, a number of which are reproduced on the following pages, will also be included.

Exhibition

An exhibition of the winning and commended designs submitted in the competition will be held at the Royal Society of Arts during the three weeks preceding Whitsun. Further details will be announced in the *Journal* in due course.

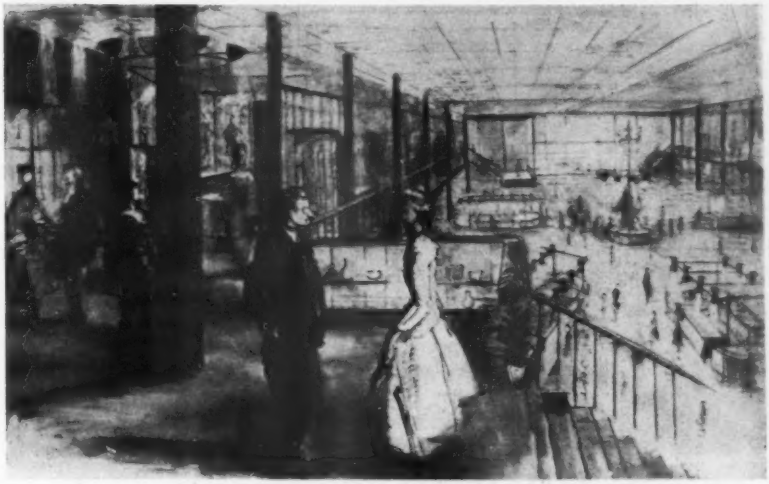
1957 COMPETITION

The Council have decided to hold a further competition in 1957, which will be organized on the same lines as that in 1956. Particulars of this competition will, as stated above, be published in May, and the list of sections to be included will then be announced in the *Journal*.

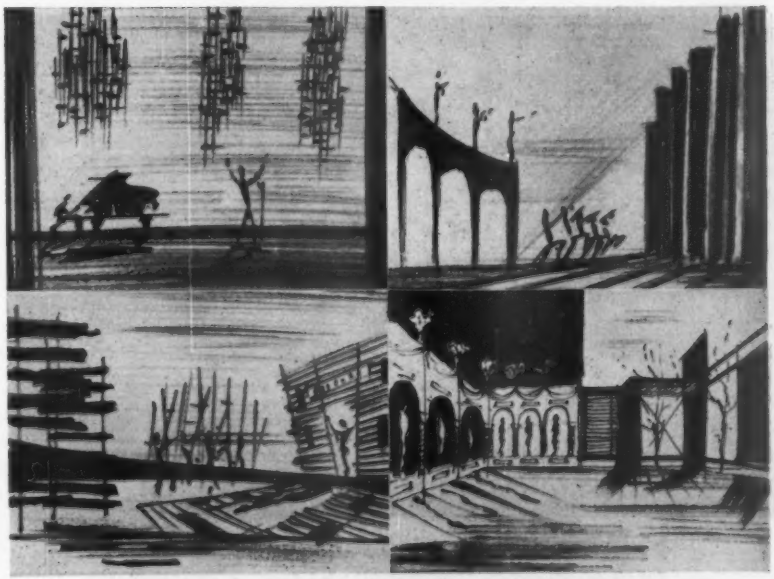
* Also awarded Associate Membership of the Society.

SOME OF THE DESIGNS

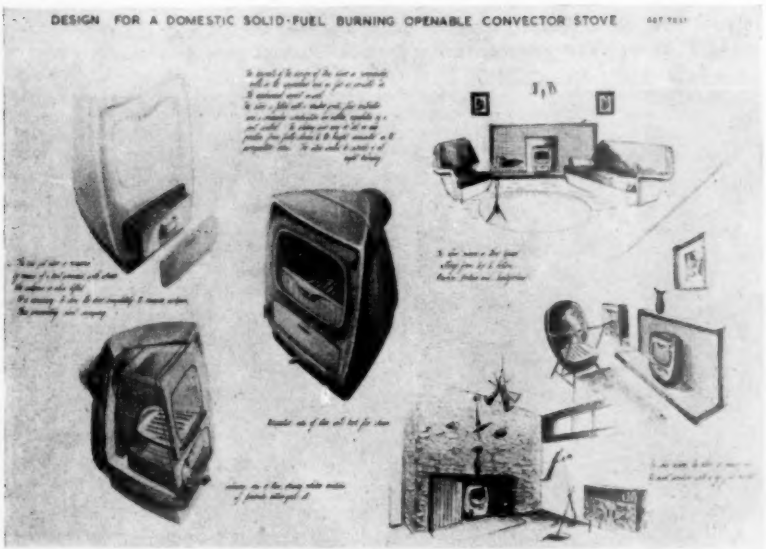
All the designs reproduced in these pages were submitted for the set tests: the captions are taken from the students' own descriptions



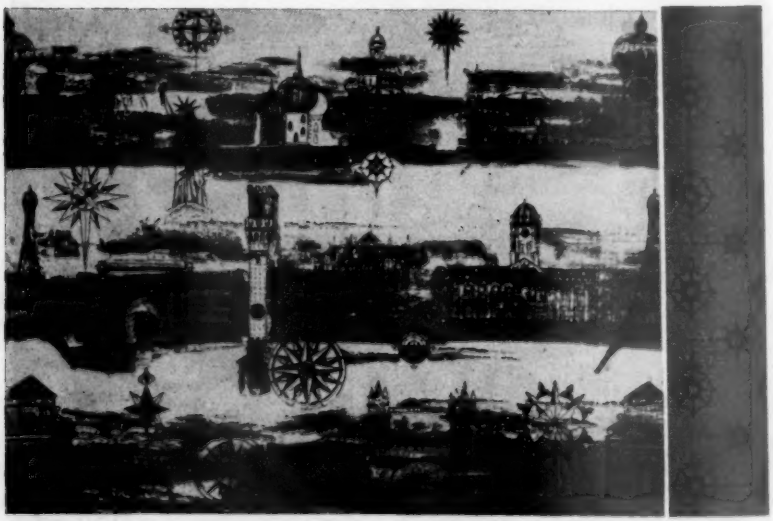
A film set of a large store, by Mr. S. G. Morris



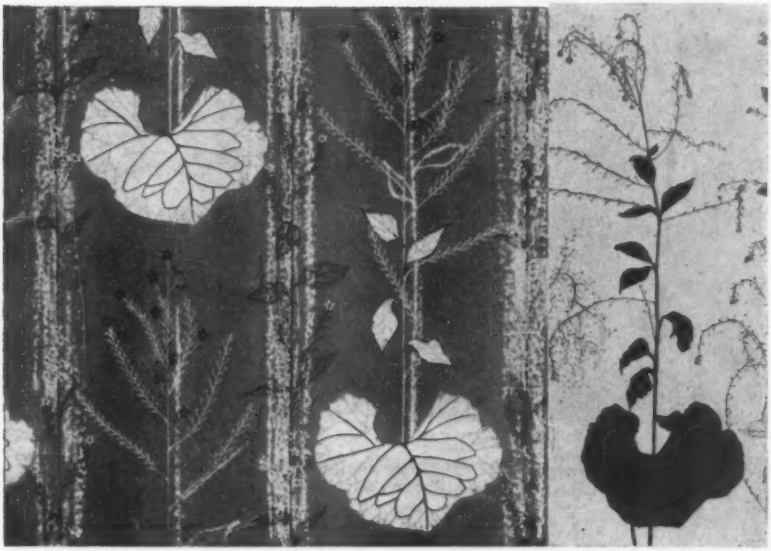
Four sets for a television variety programme, by Mr. M. L. C. Goulding



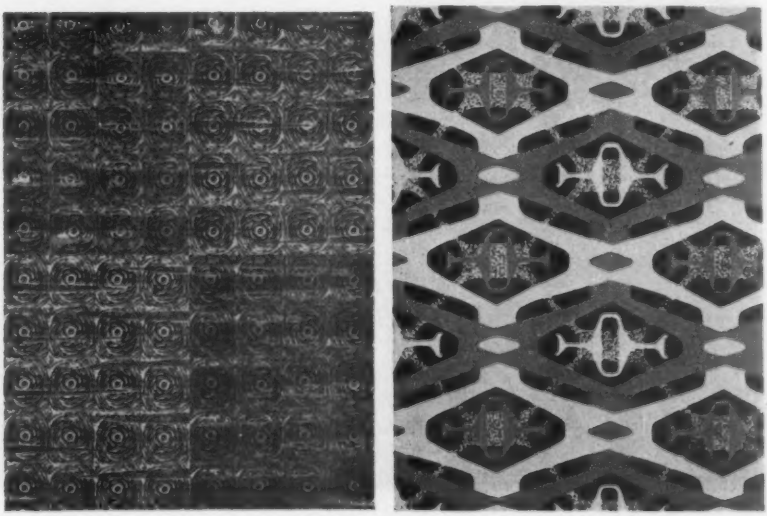
A solid-fuel-burning openable convector stove, with suggested settings, by Mr. D. J. Keepax



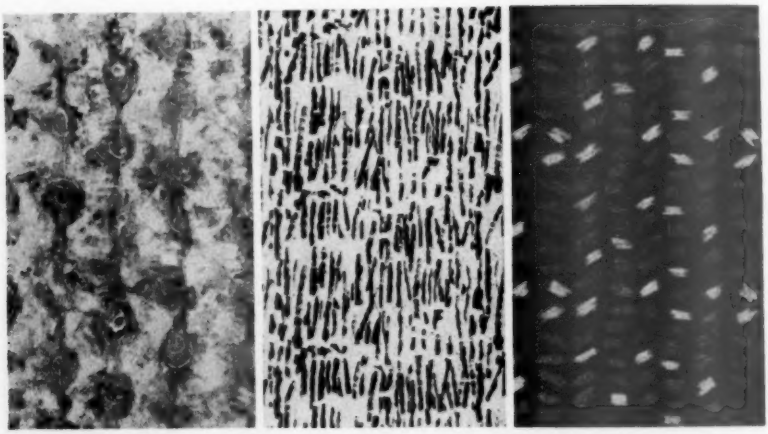
Left: *A three-colour screen-printed heavy cotton curtain fabric for an airport waiting room, together with,* **right:** *a two-colour Jacquard for harmonizing upholstery, both by Miss H. Porter*



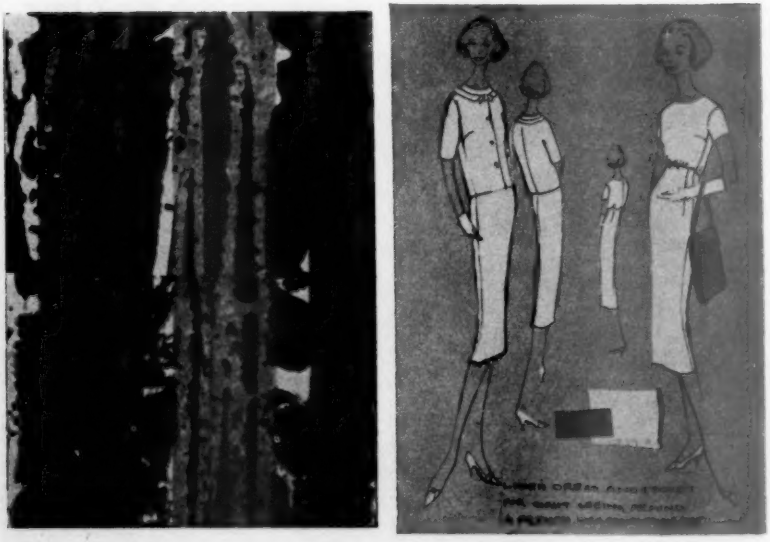
Left: *A three-colour screen-printed wall-paper design for a Victorian house, based on,* right: *a flower sketch submitted as an example of work, by Miss H. Porter*



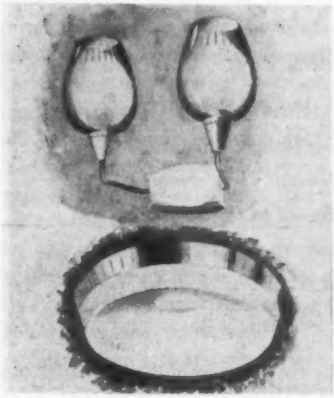
Left: *A laminated plastic table-top for a railway restaurant car, by Mr. P. C. Jackson;* right: *a Wilton carpet for an airport waiting room, by Miss J. Tee, who received the* SIR FRANK WARNER MEMORIAL MEDAL

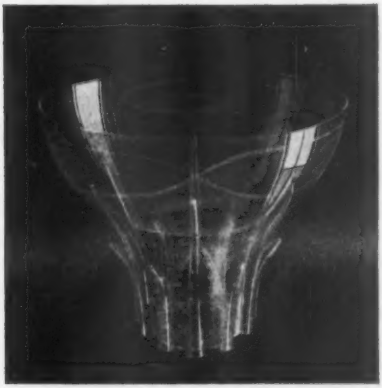


Three colour-printed dress textiles, by Miss D. Dyall

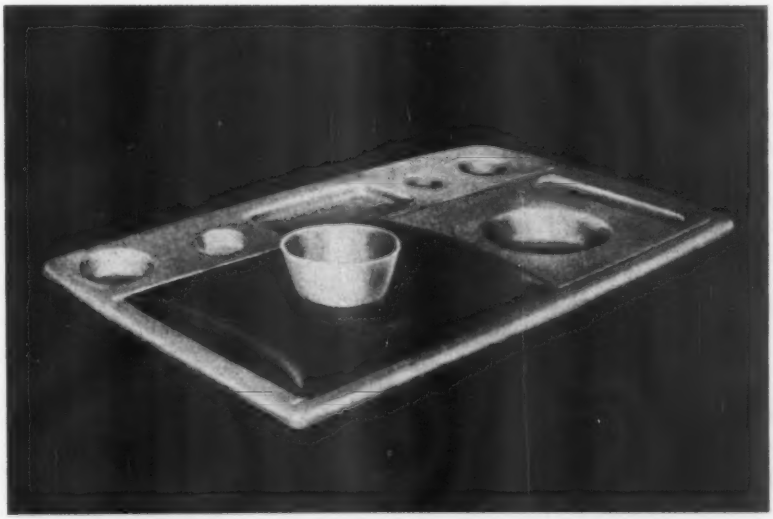


Left: *A silk woven evening dress fabric, by Miss V. Carr;* right: *a linen dress and jacket for the seaside, by Miss E. J. Allen, who was awarded a* BIANCA MOSCA MEMORIAL AWARD

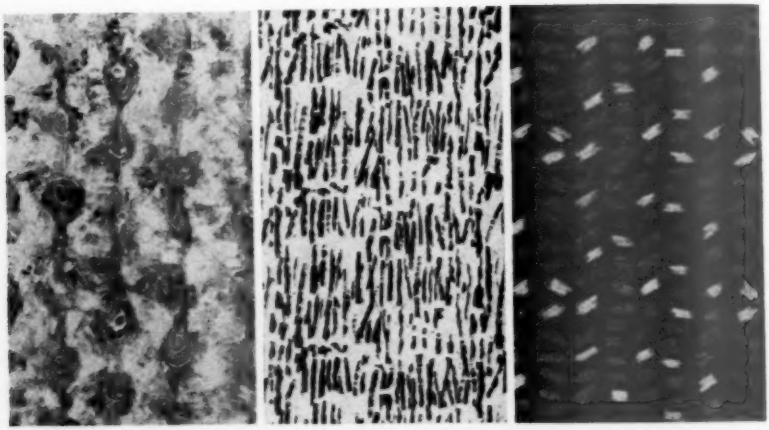




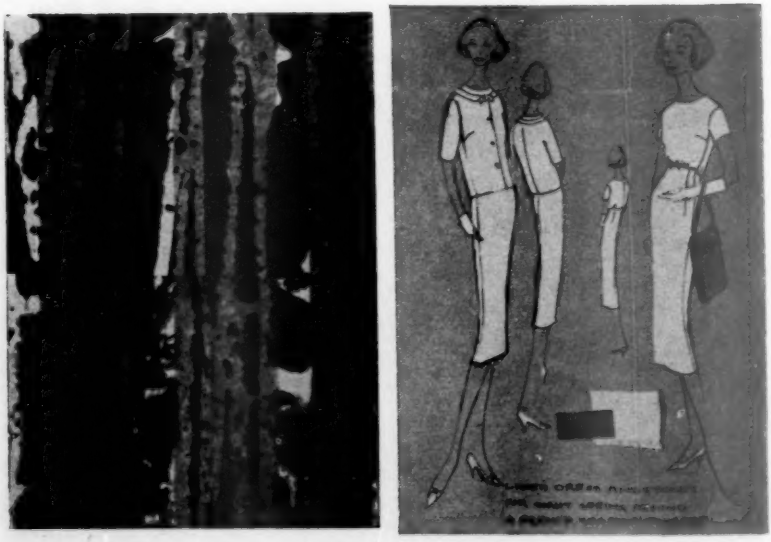
Left: *Lighting fittings for a theatre foyer, by Mr. B. Sams;*
right: *a glass presentation bowl, by Mr. J. N. Ritchie*



A 'Perspex' meal-tray for use in an aeroplane, by Miss J. M. Timmis



Three colour-printed dress textiles, by Miss D. Dyall



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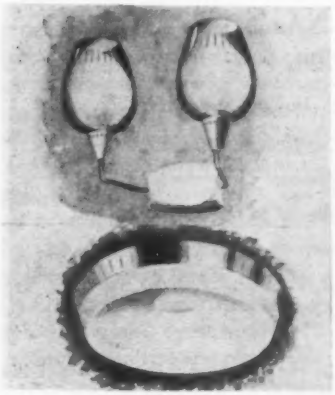

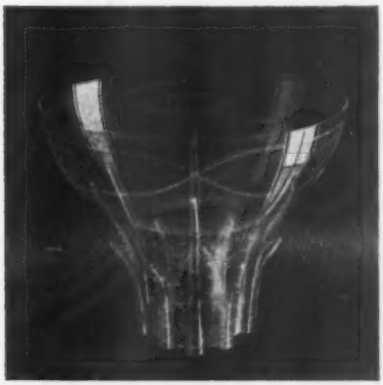

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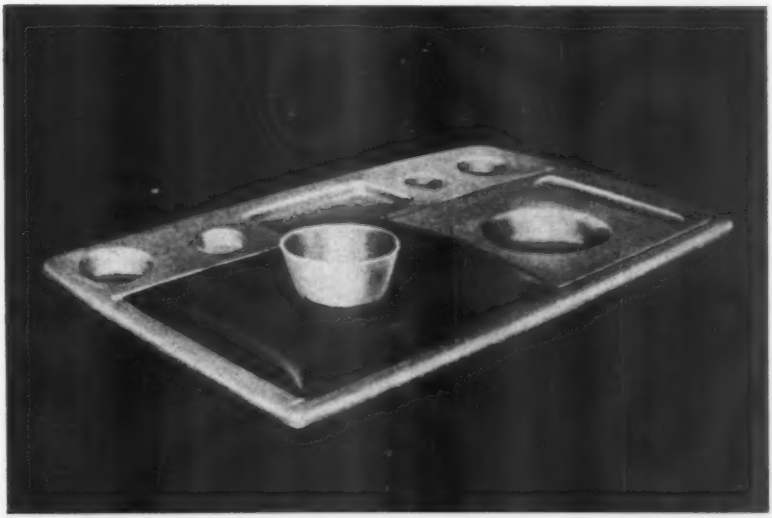

A 'Perspex' meal-tray for use in an aeroplane, by Miss J. M. Timmis

AIR CONDITIONING OF BUILDINGS

The Alfred Bossom Lecture by

J. S. HALES, B.Sc., A.Inst.P., F.Inst.F., A.M.I.H.V.E.,

Director, Heating and Ventilating Research Council, and Director, Industrial and Domestic Development Laboratories, B.C.U.R.A., delivered to the Society on Wednesday, 28th November, 1956, with Sir Howard Robertson, M.C., A.R.A., P.P.R.I.B.A., S.A.D.G., in the Chair

THE CHAIRMAN: Your lecturer, Mr. J. S. Hales, is the Director of the Industrial and Domestic Development Laboratories of the B.C.U.R.A., which means the British Coal Utilization Research Association. I have never heard it called B.C.U.R.A. before, but I expect that it is an economy measure! He is also Director of Research of the recently formed Heating and Ventilating Research Council, facilities for whose work are provided at the B.C.U.R.A. Laboratories at Leatherhead. Apart from very important work on industrial appliances, including large-scale boilers, gas producers, and so on, he has made a life-time study of the correct design principles of solid-fuel burning appliances. The latest development is the free standing solid-fuel fire which Mr. Hales and his colleagues have perfected to the point at which manufacturers are producing in various types. This fire, you will be interested to know, is about sixty to seventy per cent more efficient than an ordinary open fire and produces amongst other things a warmed air circulation in the room, which connects it up, I think, with the title of his paper. It is very good to look at too. So when you sit in comfort in front of one of those fires, please remember Mr. Hales.

The following paper, which was illustrated with lantern slides, was then read:

THE LECTURE

The subject title 'Air Conditioning of Buildings' clearly needs a few words of explanation, since not only is it a term heard rather infrequently in this country, but it may be interpreted as covering almost every aspect of heating and ventilating a building. Recently the American Society of Heating, Ventilating and Air Conditioning Engineers decided on the following definition:

> Air conditioning is the process of treating air so as to control its temperature, humidity, cleanliness and distribution to meet the requirements of the conditioned space.

In this definition, the control of temperature clearly implies the use of both cooling and heating to maintain the required conditions in summer and winter, and it is in this respect that differences in emphasis between this country and those abroad are most marked. The main reason for this is almost too obvious to state, since it is the relatively mild climate which we enjoy—or perhaps one should say, about which one continues to grumble!

Now, in discussing air conditioning, it is important first of all to distinguish between that designed to provide optimum comfort of the inhabitants, and generally referred to as 'comfort air conditioning', and that designed to deal with some particular manufacturing or other process which requires specially controlled conditions for its effective operation. At the present time it is clearly the latter form of air conditioning which is the more important in this country, although it will be seen that present trends are likely to bring comfort conditioning into greater prominence. Abroad, particularly in parts of the United States and in countries having extremes of temperatures, comfort conditioning assumes an ever-increasing role and makes its contribution to increased productivity by providing more satisfactory working conditions. Thus in carrying out large-scale projects in the Near East, one of the first items of equipment sent out by contractors might well be air conditioners equipped with refrigerator units for cooling and de-humidifying the air in living and sleeping quarters, so that personnel can rest and recuperate under reasonably comfortable conditions.

At first sight our own relatively mild climate might appear to be of distinct advantage when it comes to the application of comfort air conditioning, where this is necessary. But the fact that bad weather conditions are seldom severe enough, or sufficiently prolonged, to compel the installation of relatively expensive equipment for automatically maintaining buildings at optimum conditions winter and summer, is obviously a major difficulty. The result is, therefore, that, as in the case of the heating of the average British home, there is a tendency to compromise and spend the very minimum on equipment and automatic control equipment.

The subject of air conditioning is, however, daily becoming more and more important, and although it is still a long way from becoming part of our standard of living, like television and other amenities, many factors at the present time will undoubtedly hasten its growth in industry and commerce. In the United States this growth has become phenomenal; for example, there has been a yearly increase of about fifty per cent in sales of room and central home air conditioners, and nearly 3 million homes out of a total of some 45 million now have such units installed. The sale of these conditioners naturally follows the general level of summer temperatures experienced; thus in regions where the average summer temperature is 65 degrees Fahrenheit, about one in every hundred purchase some kind of conditioner, while with average temperatures in the region of 75 degrees Fahrenheit, yearly sales are three times as great.

FACTORS INFLUENCING THE ADOPTION OF AIR CONDITIONING

Although as regards comfort air conditioning, summer temperatures in this country rarely call for a degree of cooling which cannot be reasonably provided by natural ventilation in the average office or home, conditions in most of our cities are changing in a manner that makes air conditioning very desirable in some circumstances. The increasing size of office blocks, many with extensive floor areas, is one instance of a trend of development in which the overheating and lack of ventilation of the internal areas, due to absence of outside windows

and general low heat loss, calls for a measure of artificial cooling by a system of air conditioning. Again acute problems of noise arising not only from traffic at street level, but also increasingly from overhead, are mitigated only by ensuring the tight closure of outside windows which cannot then even be used as a natural method of ventilation. Of equal importance to that of noise is the question of dirt in the atmosphere, and here again the opening of these windows or even the infiltration of air through badly-fitting windows often causes unpleasant conditions and results in heavy maintenance of decorations and furnishings, particularly in the larger industrial towns.

Mention should perhaps also be made of the uncomfortable conditions which can prevail even in this country through solar gain of heat, especially where there are large areas of glass as in quite a number of the more modern buildings. In such cases the use of venetian blinds or non-actinic glass provide only a partial solution, while external shades cannot be considered practical in cities owing to the prohibitive maintenance involved.

As for public halls, cinemas, assembly rooms and similar buildings, these, in many cases, demand a standard of air purity and control of temperature and humidity, winter and summer, which only fully instrumented air-conditioning plant can satisfy. At the present time, almost without exception, cinemas have no facilities for chilling the circulated air, and most people will be only too-well aware of the discomfort of such places in warm and humid weather.

In the industrial field, the increasing need to manufacture specialized goods to a standard and precision demanded by overseas competition and technical progress in processes and automation, implies that unwanted variables which can upset or retard production and productivity, such as the temperature and humidity of the works, stores or office, must be eliminated as far as possible. All these factors, therefore, point in the same direction of increased control over the air which surrounds the machines, the products and the staff involved.

COMFORT

It may be appropriate here to say a little about comfort, a word used rather loosely to indicate that the conditions of temperature, humidity and air movement are satisfactory. However, as with the senses of smell and taste, different people have different ideas as to what constitutes comfort, and the best that one can ever do is to provide conditions which the majority of people vote as acceptable. There are, however, a number of conditions which almost everyone finds distinctly unpleasant: for example, when the air temperature at head level is much higher than at foot level, or when the general air temperature is appreciably higher than the general surrounding wall temperatures, or when there are noticeable draughts, particularly at foot level, or again when the air is too still, or stagnant or very humid. Someone once said that all that was required was the condition of a bright spring day, when there is a feeling of warmth on the body, but with gently moving cool air around. As with most natural phenomena, science has not yet quite produced the spring day or its equivalent.

One complicating factor about comfort is that of acclimatization, since people

vary considerably in their reactions in passing from one set of conditions to another. Some experts recommend a degree of variability in order to sustain a more stimulating atmosphere. Others consider it desirable to allow the inside temperature in an air-conditioned building to rise somewhat in sympathy with the outdoor temperature. This practice, which is quite common, is actually followed in the House of Commons, in which the inside air temperature is deliberately allowed to rise when the outside temperature exceeds about 78 degrees Fahrenheit. Under such conditions, however, it becomes increasingly important to ensure that the humidity of the air does not become excessive if discomfort is to be avoided.

AIR-CONDITIONING EQUIPMENT

The design of air-conditioning equipment to provide the control of temperature both by cooling and heating, moisture and purity of the air in a building takes a variety of forms, and it is not the purpose of the present lecture to describe the many variations which are possible. Basically most arrangements can be split into their main components which comprise (i) an air filter for the incoming outside air; (ii) means for regulating the humidity of the air; (iii) means for adjusting the final temperature of the air for either heating or cooling purposes; (iv) fan units to circulate the conditioned air; (v) duct-work with associated air outlets to distribute the air to various parts of the building as required, and finally (vi) automatic controls to regulate the various parts of the system.

The scale of such equipment varies probably more widely than any other single type of engineering plant, and can range from the smallest unit designed to fit into the lower part of a window to condition the air of a single room, to the extensive centralized services for the largest offices.

ATMOSPHERIC IMPURITIES AND FILTRATION EQUIPMENT

Atmospheric dust—a term intended to cover all the solid impurities in the air including smoke—is of vital concern in air conditioning, and on the effectiveness of its removal may depend the whole success or failure of the installation. This aspect of the equipment is likely to assume even greater importance as the cost of maintenance of decorations increases with the growing cost of labour and materials.

The main point of entry of dust and pollution is, of course, the fresh air intake into the air-conditioning plant—although 'fresh' may sometimes be rather a misnomer. Dust can also enter a building through open windows or cracks around badly fitting windows, and hence these should be of sound construction to minimize leakage. By designing the air-distribution equipment to maintain a slight positive pressure in the various rooms, it is then possible to exclude most of the extraneous sources of pollution and thus ensure that the whole of the fresh air supply enters *via* the filtering unit. As already noted the tight fitting of windows is in any case very desirable from the point of view of excluding unwanted external noise. It is interesting in this connection to note that several buildings have in fact been designed and built with the almost complete exclusion

of outside windows, with consequent simplification in construction and reduced heating and cooling requirements. It cannot be said, however, that this somewhat extreme form of construction has met with universal approval, although it undoubtedly lends itself to departmental stores and similar buildings, and is certainly an interesting innovation. Another interesting development, which also assists in 'sealing' the points of entry of dust is that of the 'air curtain' to form an air barrier in place of the main entrance door to a building. By this method, whose main objective is to provide an unrestricted entry into buildings such as stores, suitably conditioned air is blown down across the opening with sufficient speed and in such a direction as to provide an effective screen.

To appreciate the role of the filtration equipment, it is necessary to know something of the composition of dust in the atmosphere and some of the difficulties in its removal. In an average city's atmosphere, which may contain ½ million particles or more in every cubic inch (compared with a mere 50,000 in country areas), nearly half the weight of impurities may consist of carbon and tarry particles, and the vast majority of all the particles may be concentrated in the very smallest sizes of 0·2–2·0 microns (a micron is one-thousandth of a millemeter, and for purpose of comparison the average diameter of the human hair is about fifty microns). When it is remembered that these are the particles which may be mainly responsible for staining decorations and fabrics, since these are not removed effectively by simple methods such as water washing with sprays, owing to their greasy and tarry surfaces, it will be appreciated that the selection of the right kind of filter is of paramount importance.

Many different types of filtration equipment exist, such as fabric filters, viscous coated filters, electrostatic filters. Each of these types has its own particular characteristics and applications, and in some cases two or more types may be combined to satisfy the necessary standards of air filtration. For removal of the very fine particles, often largely responsible for staining troubles, there is little doubt that the electrostatic filter is the most effective. Although this type of equipment is relatively expensive, its maintenance costs are low, whereas many of the throw-away designs of filters are much cheaper in first cost but entail considerable maintenance.

It should be noted that some care is needed in comparing the efficiencies of different filters, since not only is it necessary to specify rather carefully the range of particles to which the particular efficiency applies, but also to compare such efficiencies on the basis of the relative amounts which the different filters allow to pass through. Thus two filters having efficiencies of 98 per cent and ninety per cent on the same dust-laden air, allow two per cent and ten per cent respectively to pass through; thus the first filter is five times as good as the second. Similarly, a filter of 98 per cent efficiency compared with one of half that efficiency will have an advantage of about 25 to one in its favour. Where relatively large volumes of air are circulated, these figures become of great significance, and what might appear as a relatively small drop in efficiency may well mean a substantial increase in staining trouble.

High filtering efficiencies may sometimes be obtained by substantial reduction

in the speed at which the air is allowed to pass through certain filtering materials. This, however, is seldom practical owing to the extremely large expanse of filtering surface required, and in consequence the serious problem of finding or allocating sufficient room to house such equipment.

One recent development from the United States is the so-called self-generating electrostatic filter. This consists of a resin-coated fibre filter which builds up an electrostatic charge as high as 1,200 volts and is stated to retain this charge for long periods. It remains to be seen, however, how far this is proved in practice where the dust deposits are of an acidic nature, since these may well be able to discharge the voltages first established.

One aspect of filtration which must obviously be kept in mind is the possible influence of smokeless zones in reducing the excessive amount of soot and tarry particles and thus reducing the load on filtration equipment. Perhaps, however, this will be offset by the increase in atmospheric pollution caused by motor car and diesel bus and lorry exhausts. It may be, therefore, that the present practice of siting the 'fresh'-air intake for the air-conditioning plant somewhere between street level and roof level, in order to minimize pick-up of dust on the one hand and smoke on the other, may change, and in smoke control areas the fresh-air intake may move up towards roof level.

SOUND AND NOISE PROBLEMS

Mention has already been made of the advantages of air conditioning in excluding external noise entering windows. But this presupposes that the noise arising from the operation of the plant itself is acceptably low. The amount of noise so produced is dependent on several design factors, most of which are concerned with the fan and circulating duct arrangements for the conditioned air.

The most general procedure for reduction of noise level produced by the circulating system is to use, as far as possible, low-speed fans and low velocities in ducts and at air outlets, and recommendations exist for this purpose. This procedure, however, often leads to the obvious difficulty of requiring large fan and duct sizes which sometimes present the architect with a difficult planning problem. Consequently, in recent years, attention has been given to high-pressure high-velocity systems which bring about substantial reductions in duct sizes. Naturally, such high-pressure and high-velocity systems, which absorb more electrical power for a given air flow, have to deal with increased noise generation by special designs of sound baffles and absorbers in ductwork and at air outlets, and brief mention will be made later of one or two such methods.

In the case of low-speed fans and generally low-air velocities (usually less than twenty feet per second in the main ductwork) the noise produced is concentrated at the lower frequencies, whereas with the higher speed fans producing higher pressures and increased velocities in ductwork the predominating sounds are in the middle frequencies. Although these latter frequencies are in the more sensitive range as far as the human ear is concerned—and the need, therefore, for their more effective reduction all the more important—it should be remembered

that some sound-absorbing materials and methods have selective characteristics and thus offer scope for design in coping with the necessary reduction of sound. Clearly the need for sound attentuation will depend on the function of the particular building being air conditioned. Probably the most stringent requirements are for broadcasting studios, while concert halls require special consideration, with hotels and offices coming next in order.

AIR OUTLETS AND THEIR LOCATION

Although the primary object of the air outlets is to bring in the conditioned air, they should be arranged so that they produce as much eddying of the surrounding air as possible without, however, causing noticeable draughts. In this way they can produce a more stimulating atmosphere and counteract any tendency towards stuffiness in isolated regions. Experiments have shown that the slot form of inlet is more effective in creating eddies than apertures having more uniformly proportioned dimensions, including grilles, and there are now a variety of designs, including concentric baffles, which aim at achieving the best distribution pattern. In one American installation, use is made of a continuous slot extending the full length of the room for the admission of conditioned air; in this instance the air is directed upwards to sweep over the extensive window area and so counteract any downcoming cold air which might otherwise produce unpleasant floor draughts—in the same way as radiators placed under windows. Problems arise, however, with this method when curtaining is required at windows.

In some designs of outlets for the higher-velocity systems now being used, a carefully arranged sound-absorbing chamber is incorporated immediately behind the outlet, which is invariably provided with means of adjustment for both velocity and direction of the incoming air.

The actual positioning of air outlets must depend to a large extent on the type of space to be conditioned, and whether or not the outlets must be disguised. Thus in the traditional type of building there will probably be a tendency to conceal the outlets, while with more contemporary structures the outlets may well be made a feature, or form some part of a special treatment of ceiling or wall. In all cases, however, it is vitally important that the outlets are in the right place and not tucked away merely for the sake of appearance.

Whatever treatment is preferred, outlets must prevent the incoming air from splaying on to nearby surfaces, since even if the air filtration is highly efficient, there is always a tendency for dust particles to deposit themselves on such surfaces, particularly when the latter are at a lower temperature than the air. Although from some points of view, principally that of temperature distribution between floor and ceiling, outlets at the base of the room have some advantages, the problem of dust pick-up at floor level, and the increased difficulty of avoiding noticeable draughts, are serious objections. Certainly in the case of a public hall where smoking is permitted, there is everything to be said for bringing the conditioned air in from the top and extracting from the base, thus keeping the upper atmosphere as clear as possible.

EXAMPLES OF AIR-CONDITIONING SYSTEMS USING SMALL DUCT SIZES

It is not until either a drastic reduction occurs in the amount of air to be circulated, or until the high-pressure high-velocity systems or combinations of the two are employed, that really small ducts become possible One method of reducing the amount of air to be circulated is to take most of the heating and cooling load away from the air and to distribute it, using water as the heating or cooling medium in heat transfer surfaces installed in the actual spaces to be conditioned. One such method now being extensively adopted in the United States makes use of high-velocity air distributed through small ducts to individual heating and cooling cabinets situated in the conditioned space, the coils in the cabinets being fed with either chilled or hot water as required from a centralized source. The air issuing from the high-pressure apertures in the cabinets is first carefully baffled to eliminate unwanted noise, and is so arranged as to entrain

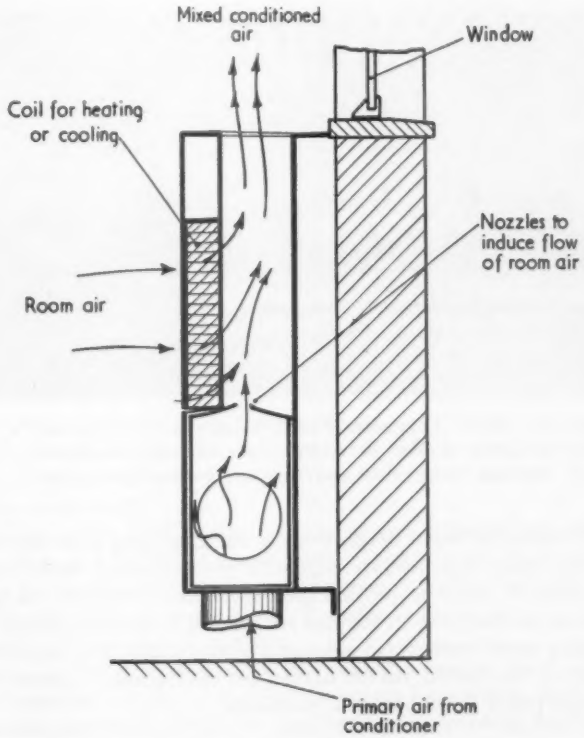

FIGURE 1. *Diagram showing cabinet for heating or cooling using high-pressure air supplied from small ducts carrying air at high velocity*

large volumes of the room air which are thereby induced to pass through the heating or cooling coils, thus producing the required room temperatures. The primary high-pressure air is often less than one-fifth of the total air circulating through the room, and this, combined with the high velocity in the ducting, enables the latter to be of very small size. It should be noted with this system that provision must be made for draining away the condensate which forms on the cooling coils in each of the cabinets.

Another method of splitting the heating and cooling load between surfaces in the room and distributed conditioned air, and thus reducing duct sizes, is that employing ceiling panels which can be fed with either heated or chilled water, and by incorporating ducts and outlets for conditioned air in quantities only sufficient for normal air change requirements. With this method the limit to the amount of cooling by the ceiling panels is mainly the need to avoid condensation on the surfaces.

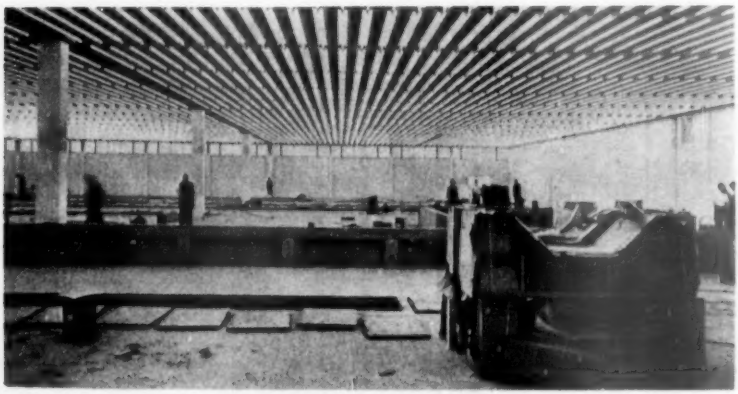

FIGURE 2. *An example of ceiling panels in a British factory, providing heating or cooling combined with conditioned air flow through ducts and inlets incorporated in the panels*

A third method of recent development is one employing twin supplies of hot and cold air using high-pressure high-velocity distribution. According to this method, which is stated to provide good individual control for all parts of a building, the hot- and cold-air supplies are blended in specially designed outlets, incorporating sound baffling and automatic control dampers of special construction. Since, in this method, the full heating and cooling load is carried by the air, the electrical power consumption is increased.

INDUSTRIAL AND SPECIALIZED APPLICATION OF AIR CONDITIONING

By far the largest field of application of air conditioning is to be found in industry, where requirements for controlled temperatures, humidity and purity

are rapidly becoming more and more exacting. Each section of industry has its own particular problems, and it is only possible to touch lightly on a limited number of aspects of special interest. In many cases the air conditioning is purely local and applied merely to the particular machine or part of the processing plant needing accurately controlled air conditions.

Not unexpectedly many of the newer synthetic fibres now used on high-speed precision machinery demand controlled atmospheric conditions, and the case of nylon-stocking manufacture is a good example in which special emphasis is placed on control of humidity and temperature—humidity to ensure that the fibres remain sufficiently strong, and temperature to ensure that the very small tolerances used in the knitting process remain unchanged. In many textile processes the need to maintain an optimum humidity of the surrounding air may be occasioned not only by the need to maintain adequate strength and elasticity in the fibre, but also to avoid the build-up of static electricity which may result in the slowing up of the process caused by the fibres being attracted to parts of the machinery or adjacent fibres being repelled from one another.

Fruit storage is another example where air conditioning is playing an ever-increasing part in maintaining the necessary standards, but in this case not only must humidity and temperature be carefully controlled during storage and ripening, but also the chemical composition of the circulated air, particularly the carbon dioxide content. In this case also, chemical additives are sometimes used for accelerated ripening.

The food industry employs a wide variety of air-conditioning plant to ensure consistent products and safe storage, and each process, whether it be baking of bread on a large scale or the making and storage of jam or macaroni, demands accurate control over temperature-humidity and purity of air, without which serious losses can occur, due to such things as the rapid growth of mould on exposed surfaces or even the apparently trivial mishap of labels falling off the containers!

For some industries the need for air purity and complete freedom from even the finest particles of dust in the conditioned air are of paramount importance. One such case is the watch-making industry, while another is that of photographic materials in which there is a further requirement for freedom from 'fog'-producing contaminants.

This is just a very brief reference to one or two industrial processes which depend on the right kind of air conditioning for their success, but it emphasizes once more that as large-scale production increases with more stringent economic conditions and higher costs of labour, the need for such accurate control of environment will continue to increase.

Activities somewhat removed from the purely industrial field, but of considerable importance, occur in specialized research laboratories, many of which are, of course, attached to industrial organizations, in operating theatres, and in libraries and similar buildings where valuable records or works of art are housed. Some of these present very special problems, such as those associated with atomic energy, since here the problem of filtration may be complicated by the

presence of radio-active materials. Nowadays operating theatres are provided with air-conditioning equipment specially designed to remove the smallest particles of dust on which bacteria may cling, with temperature and humidity control to give the safest conditions for patient and operating staff alike. In this instance no air from the theatre is recirculated as in most comfort air-conditioning arrangements. Libraries and art galleries pay particular attention to humidity control—not too low, in order to preserve the optimum moisture content of the paper or convas, and not too high, to run the risk of mould formation and growth.

ODOUR AND STERILIZATION OF AIR

Apart from questions of air purity in terms of quantity of dust, the problem of odour and sterilization is sometimes encountered. Although a good deal of work has been done on the subject over the last few years, the mechanism whereby odours are eliminated is complicated, and it is difficult to differentiate between elimination in the chemical sense and a mere masking of the odour by another of a more pleasant variety.

There is some evidence that ozonization of the air, through the medium of ultra violet light, breaks up the chemical structure of certain odours and neutralizes the air, but care is needed to avoid any excess production of ozone with its familiar pungent smell, since this acts as an irritant. The case of chlorophyll as an odour destroyer, about which one hears a good deal nowadays, is far less well established and one is reminded of the often-quoted case of the original Old Bailey in which it was found necessary to spray the inlet air with essence of violets in mid-afternoon whenever the courts were sitting!

One interesting fact which has been established in connection with odour is that some odours, particularly those associated with fabrics, linoleum and paint, become more apparent as the humidity increases, but this must not be confused with the common experience of 'places smelling damp'.

AIR CONDITIONING AND POSSIBLE TRENDS

It is seen that, although the place of air conditioning in many industrial applications is well established and will undoubtedly continue to expand, some of the problems associated with the provision of complete air conditioning in other fields will tend to retard its more ready adoption. Capital cost is one of the main deterrents, particularly where the advantages of a clean controlled atmosphere cannot easily be put on to a firm monetary basis. Another difficulty is that of providing sufficient space to house the somewhat extensive engineering services which a good system of air conditioning may involve, and here the trouble may often be a reluctance or omission of the architect and heating engineer to get together at an early enough stage of planning, so that each fully understands the requirements of the other and a satisfactory and convincing scheme is put to the client or purchaser. Too often one hears of insufficient space left for the provision of the best type of plant, or unwillingness to spend that additional capital for those extra controls which may make or mar the whole project.

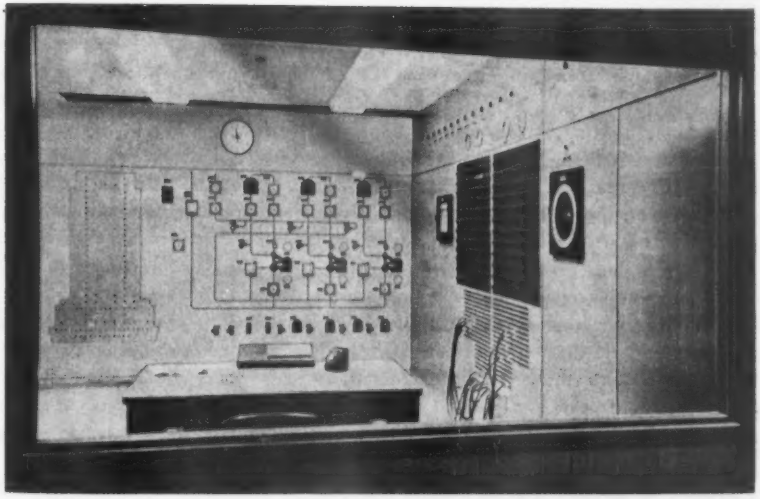

FIGURE 3. *An example of a United States air-conditioning control room installed in a prominent position in the entrance lobby of a large bank and office building*

In this respect the United States and Great Britain undoubtedly have somewhat different outlooks, which are often reflected in their approach to engineering services as a whole. For instance, the American will more readily accept a piece of engineering equipment in his home which performs an obvious function even though it be somewhat obtrusive to the average Britisher. In some cases in the United States, a deliberate feature is made of the engineering side of air conditioning, by displaying such equipment as control panels in a prominent part of the building for passers-by or users of the building to see in operation. This approach would seem to have much in its favour, and may almost be said to be making a virtue out of a necessity. The value of display of this kind, which shows every sign of being more widely adopted, can clearly also have a monetary value in reaping a return for the architect, engineer and client alike by advertising how well the whole job has been done and how well the rooms of the building are air conditioned. It may be that where such display of engineering can be arranged, some of the capital cost in installation of air conditioning can be set off against advertising!

In looking at future trends one must obviously not omit reference to the possible use of heat-pump cycles of operation. As most people know, the heat pump enables low-grade heat, such as that in the outside air, to be up-graded to a useful temperature, using a relatively small amount of energy generally in an electrically-driven refrigerator.

Abroad there are a number of installations in use, but their success is determinated to a large extent by the availability of a suitable source of low-grade

heat, cheap electrical power and a fairly large cooling-load requirement. It is true that in this country, in spite of the great energy advantage obtained (which may amount to obtaining about $3\frac{1}{2}$ times the quantity of heat put in as electricity for driving the plant) the cost of operation compared with more conventional heating, for example by oil, shows little saving. Where refrigerating plant is already being installed for cooling purposes, one is perhaps more than halfway towards the possibility of heat-pump operation, with its attendant advantages on the score of labour, maintenance and freedom from atmospheric pollution. Even the possible disadvantage associated with fairly frequent defrosting of heating surfaces where outside air is used as the source of heat can be overcome by reasonably simple means which would only absorb some two to three per cent of the total heat requirements. In any event, the fuel situation will change progressively with electricity costs tending to show increasing advantage over those of other fuels in the years ahead, when atomic energy will contribute a major part of the supply of power, and the costs of alternative sources of energy will tend to rise at a faster rate as they become less freely available.

Finally the general appreciation of the value of clean and controlled air will itself create demands for its wider use, and make us follow the American trend—but in a mild form—of 'air conditioned mindedness'.

DISCUSSION

THE CHAIRMAN: I would like to start the discussion by asking Mr. Hales a question which concerns me, as an architect, very much. I have noticed in recent buildings, chiefly in America where they have done more of them, and on the Continent, that there is a great difference of view about fenestration. In many office buildings you will find that the windows are separated by areas of wall of practically the same width as the windows. In other buildings you will find continuous strip windows. I read a technical article in an American technical paper about this, expressing anxiety about the loads thrown on the air conditioning with such an enormous amount of glass, especially on south and west walls.

Can Mr. Hales throw any light on the kind of percentage of extra load which is thrown by this enormous amount of fenestration, because it affects architectural design really fundamentally? From the very outset one has got to think of that.

THE LECTURER: The question of windows is, of course, of paramount importance. In fact windows, as I have perhaps already indicated, can cause a lot of difficulty. They are a trouble spot, and there is no doubt that as you increase the size of the window so two problems are accentuated. The first is the solar gain of heat. You can minimize that by, of course, internal blinds; special glass can be used to reduce it to some extent; certain types of double windows with ventilation could be used, but they would be rather expensive. The second problem is the increase in heat loss. So in fact there are two disadvantages, and it is a very serious matter. The other thing that might be mentioned in this connection is, that if there are very large windows steps might have to be taken to offset the adverse radiation effects which you get from the glass areas during cold weather, in order to avoid the chilling effect which you get from those exposed areas. It is for that reason that one normally places radiators under windows to do two things: first, to give a certain amount of radiation to off-set the adverse low temperature of the window area, and secondly, to prevent

the down-flow of chilled air. It is, indeed, a difficult problem and one partial answer is much better windows, such as double-windows, or special types of windows, but they all involve additional capital cost. Although one can on paper indicate that the capital cost will be got back in so many years, I am afraid that it is the old problem of persuading the people who have to spend the money that it is well worth while.

MR. HENRY WILLIS: What does the lecturer consider to be the ideal temperature and humidity for (*a*) a concert hall, and (*b*) a private dwelling assuming automatic control?

THE LECTURER: People vary in this, but I should think that a temperature of 68 degrees and fifty per cent relative humidity are round figures that are acceptable. At the same time a medium degree of air movement is required. In the case of houses, normally that is the sort of temperature one would maintain in a living room, perhaps that is a little bit high, but for other parts of the house you would compromise on temperature because of the various occupations involved. Kitchens and bedrooms would in fact probably take a lower temperature. For maximum fuel economy the temperature in a house would normally be graded to reduce the amount of heat input to the lowest level possible. This question of fuel economy brings in the question of insulation.

MR. J. R. PATERSON: Would the lecturer amplify his comments on filters? He talked of operating a pair of filters in series, but I believe experience has shown that that is only applicable to certain types of filters. Would he please give some explanation of his ideas of such arrangements?

THE LECTURER: Filters have, of course, different characteristics. Some are highly efficient but present a problem with regard to the collection of too much material on their surfaces, and in other cases a filter is highly efficient, but there is just the odd chance that rather large particles may be dislodged and will be carried forward—hence one might have a combination of filters to deal with various contingencies. One might, for example, have a first filter such as a viscous-coated filter to take out the somewhat larger particles and deal with the bulk of the dust. One might then have an electrostatic filter for ensuring the very highest efficiency, particularly for the smallest particles, and then one might have just, as it were, a long-stop filter in order to avoid the possibility of larger agglomerates being carried forward in the system. The question of capital cost would obviously be a difficulty, but on balance it might be found that in terms of service and maintenance a combination of that sort would be one of the best to use. In view of the fact that the filtration aspect is so very important, any steps that can be taken to improve the performance and maintenance of the unit would certainly be well worth while.

MR. VERNON HARDY: The conditioning plant shown on the sketch dealing with filters did not mention pre-heaters. I would like to know the lecturer's view on them and their use for humidity control.

THE LECTURER: For simplification there were one or two units such as a preheater left out of the diagram, and this did not show therefore the various combinations possible. For example, a spray chamber was shown for cooling and humidification, but a cooling coil could have been substituted. The various components have their application under certain conditions, as, for example, the by-pass on the humidification plant.

MR. T. C. ANGUS: Does the lecturer agree with the statement recently made in print that the continental closed stove was very much more efficient than the new free-standing scientifically designed fireplaces now made in this country? I doubt it very much myself.

Then there is the question of radiant heat through windows. Some years ago Professor G. P. Crowden, of the London School of Hygiene and Tropical Medicine, showed that if a bright aluminium surface were put inside the window on a roller blind, a tremendous lot of heat was sent out again through the window as reflected short-wave radiations. The principle is this: if you have a dark blind, the short-wave radiant heat from the sun comes in and, being absorbed, warms the blind up. The blind gets hot, but the radiant heat cannot get radiated out again because the glass keeps back the long-wave heat and lets through the short-wave heat, so you get a green-house effect. If you have a comparatively white or better still, a bright metallic blind, a great deal of this radiant heat from the sun is reflected out again without a change in its wavelength. Consequently the room is kept cool.

THE LECTURER: The material of blinds is probably quite important, and reflectivity would be of some advantage in reducing the heat gain. The only difficulty is to design a unit in order to reflect back normally and not obliquely. There may be some difficulty, therefore, in actually producing such a unit.

I hesitate to embark on answering the other part of the question. I feel that I should be led into talking about free-standing open fires, which is just that little bit removed from air-conditioning plant with which this lecture deals.

MR. ANGUS: I do not think that the reflected angle of light and heat radiations is of great importance if the reflecting blind is close to the glass of the window.

MR. JOHN HARVEY: I was particularly interested in the reference to the factors influencing the adoption of air conditioning. Few people will disagree with the technical case Mr. Hales has made out, but quite often it is not the technical case that determines whether air conditioning is to be adopted or not. Quite recently a famous London restaurant was refurbished and I was asked to handle the air conditioning of it. I put forward a very innocent kind of scheme with a certain amount of automatic control but no refrigeration. That might have followed. When I discussed the cost with the directors, they were quite appalled, and the whole thing was rejected with derision although a lot of money was spent on the décor. Apparently the air conditioning was not a commercial proposition.

In the United States the more severe climatic conditions have produced a greater emphasis on air conditioning, and the Americans are undoubtedly ahead of us technically. I am convinced, however, that a good deal of the momentum of air conditioning in the United States came from big business when it was realized that there were handsome profits to be made from its installation. Now, therefore, in the United States if you do not possess an air conditioner you are not keeping up with the Jones's. We do not want that stage to be reached here, nevertheless I do think that it is time we did something about air conditioning in places where the public congregate, such as railway trains, departmental stores, theatres, general offices, and the like.

I was interested in the lecturer's reference to the high-pressure air-distribution system. I have been reading through, in the last few days, a symposium of papers on the subject presented to the American Society some time ago, and I was interested to learn that such a system seldom justified itself solely on a basis of cost. I would have thought that such a system employing small and therefore cheap ducting would probably on the whole be cheaper than a conventional system employing lower air velocities and therefore larger ducts. In fact, it is apparently found that even when credit is taken for the building space saved, it is seldom possible to justify the high-pressure system purely on the basis of cost. Where it does justify itself, of course, is in the case of an existing building where air conditioning has to be added afterwards and where there is simply not enough space for the larger ducts of the conventional system.

Mr. Hales referred to the complications of air filtration where radio-active materials are present. I was recently concerned with an installation, not in this country, where dust storms were encountered. A dust storm will block the ordinary fabric filter very quickly and then fresh air inlet ventilation ceases.

In a laboratory where radio-active materials are present it is a normal health physics requirement that generous extract ventilation is provided. That means, of course, that there must be equally generous fresh air inlet ventilation. In our installation it was necessary to arrange a centrifugal type of dust separator before the main filter so that in dust storm conditions the filtration system was not blocked and therefore the ventilation system was not prevented from working properly.

There is just one technical point on which I should like Mr. Hales to comment. In his paper, in his reference to heat source and the heat pump, he referred to defrosting of heating surfaces by relatively simple means. I would be grateful if he would tell us what those means are?

THE LECTURER: The questioner has emphasized the problem of getting air conditioning adopted because of the cost, and the difficulty of putting the value of the air conditioning on a firm monetary basis. There is, for example, the question of the saving in the cost of decorations, but it is rather difficult to quote figures.

You raise the question of the apparently higher cost of some of the high-pressure systems. I think that you are probably thinking particularly of the twin-system of air condition in which both heated and cooled air are fed at high velocity through small ducts working at high pressure. In this case there is the increased power consumption involved, where all the heat is being conveyed by the air, plus the fact that the units required for blending the two airs, high-pressure units and so on, are that much more expensive. There is also the problem of sound attenuation, which has to be looked into much more carefully. All those do tend to make such systems a bit more expensive. Nevertheless, the importance of the high-pressure high-velocity system is that you can use a small duct and therefore achieve saving of space, particularly in existing buildings, and this is very important.

I was interested to hear about the centrifugal separator which had to be used in the particular case mentioned.

As regards the reference to the heat pump using outside air, that of course is one of the difficulties one is faced with in this country; the outside air is on the whole rather humid and above freezing point on average, and therefore the amount of refrosting that would have to be done is a good deal more, perhaps, than would be experienced, for example, in America. It is possible to refrost by certain cycles of operation, which of course absorb a little energy, but it is a small fraction of the total.

A vote of thanks to the Lecturer was carried with acclamation and, another having been accorded to the Chairman, the meeting then ended.

FROM COCOA BEAN TO CHOCOLATE

A Dr. Mann Juvenile Lecture

by

F. H. BANFIELD, M.Sc., Ph.D., F.R.I.C., F.R.S.H.,

Director of Research, The British Food Manufacturing Industries Research Association

Wednesday, 2nd January, 1957

It is always pleasant to hear the words 'Have a piece of chocolate!' We know instinctively that we shall enjoy eating it. Why is this? It is because we have a memory which can store up all the pleasures associated with eating things we like. Memory is stimulated by the sight of the piece of chocolate—if it were an unexpected colour—say, blue—we should expect the flavour also to be different. If the smell were unusual because it had been left in a box of moth-balls, then we would probably refuse to taste it! If it were so soft that there was nothing to chew, then we should not enjoy it; and if we had just previously eaten three or four pickled onions then we should not be able to taste the chocolate flavour. The full appreciation of the eating qualities of a piece of chocolate therefore depends not only on the chocolate but also on the eater.

We have been eating chocolate for about 110 years but the beverage *chocolatl* was the favourite drink of the Aztecs in Mexico when Columbus visited that area in 1502. In Europe the rather fatty drink soon became so popular that chocolate houses assumed the status of clubs. The cocoa beans from which the drink was made came from the humid coastal regions of the Americas, near the Equator, and to-day nearly all the cocoa is grown in coastal regions within 20° North or South of the Equator. The cocoa tree likes plenty of rain—say from fifty to 100 inches a year!—and also a sunshade to shield it from the intense heat of the sun. In return the tree gives two harvests of pods, some of which are formed on the trunk of the tree—an unusual sight. The pods when ripe are split by hand to yield the seeds (beans) embedded in a soft and sticky pulp and these are placed in large heaps covered with leaves and left to ferment. This age-old practice results in a bean which has developed colour and flavour—if the treatment is properly carried out—and is ready for drying in the sun and roasting. Yes, friend Montezuma made his *chocolatl* from fire-roasted beans, although to-day we control the roasting temperature very carefully. To make the beverage the roasted beans, freed from the husk, were ground on a large flat stone using a round stone as a roller. Since the bean contains about fifty per cent of fat the grinding process yielded a fluid mass which solidified on cooling. The cocoa mass, flavoured with vanilla and spices, was taken as a thick honey-like 'beverage' by the wealthy and was also eaten in solid form mixed with corn by the less

fortunate. In Europe hand-grinding of beans was superseded by the water-power mills of Dr. Joseph Fry and in 1795 in Bristol a steam-driven grinding plant was erected in Fry's factory. The rich fatty chocolate drink was modified in 1828 when the Dutch firm of Van Houten removed part of the fat from the cold mass of ground roasted beans and produced what is virtually cocoa as now sold. The fat which was removed was soon in great demand to be added along with finely-ground sugar to more cocoa mass and thus give us 'eating chocolate'.

So much for the history story. What of to-day? Our cocoa beans gathered from trees specially planted in selected areas in equatorial America, Africa and the Indies are the subject of much research, for they are a valuable crop. This research starts with a study of the variety of tree, and continues through soil studies and husbandry to the all-important process of fermentation. The research then transfers with the beans from the producing countries to the importing user-countries, where the beans are roasted, cracked to remove the thin shells, and ground so that the surplus fat may be removed from the material intended for use as drinking cocoa. This fat (called cocoa butter) is almost entirely used in the manufacture of chocolate, being added to a mixture of crushed cocoa beans and sugar in a grinding machine called a *melangeur*, which both mixes and grinds them together. It is at this stage the milk is added if milk chocolate is being made. The water is, of course, removed first. The rather coarse mixture now has to be properly refined so that all the particles of cocoa and sugar are small enough not to taste 'gritty' when the chocolate is eaten. This most important operation is performed by a power-driven machine with steel rolls set very close together and rotating at slightly different speeds. The chocolate is passed between the rolls until the refining is complete. The final treatment of the chocolate is in a machine known as a *conche*, so called because of its shell-like shape. In this the liquid chocolate is moved about inside the 'shell' by means of a moving arm until the correct flavour and texture are obtained. The product is now ready for use as slab chocolate or as a covering (*couverture*) on sugar confectionery or biscuits. The most important operation in making a bar of chocolate which 'snaps' nicely and keeps its characteristic colour and sheen is known as 'tempering'. In this the liquid chocolate is held at a well-defined temperature near its setting point until the fat is ready to set properly, for it is the cocoa butter which is the unruly partner and which when misbehaving makes the chocolate look and eat poorly.

By skilful blending of cocoa beans from different varieties of trees and by a development of his individual roasting technique the chocolate manufacturer produces his own characteristic flavour. Also by control of the grinding and refining operations and of the conching he can standardize the smooth-eating qualities of his product. Where the chocolate is used as *couverture*, either for hand-dipped or machine-covered centres, the important factor is the rate of flow (or viscosity) of the chocolate at the temperature of use. If the chocolate is too thick it will not flow evenly over the goods and if it is too thin then most of it will drain off before the chocolate has set. Proper formulation and conditioning of the chocolate are necessary to give satisfactory performance in

a modern high-speed machine. This machine which is now almost universally used, is aptly named an enrober.

The services of botanists, scientists of many categories, engineers and those important laymen with 'know-how' are utilized to provide that piece of chocolate which gives us such pleasure when we eat it. Incidentally the food value is very high so that it is no surprise to learn that chocolate appears in service rations for special operations, in shipwreck survival rations and that it was given fortified with vitamins to refugees in Europe in 1946.

I gratefully acknowledge the help given by many firms in the chocolate industry in supplying exhibits, samples, slides and films for the lecture and my colleagues who assisted in the demonstrations.

GENERAL NOTES

SOME LONDON EXHIBITIONS

An absorbing exhibition of works by Samuel Palmer and members of his circle, arranged by the Arts Council at 4, St. James's Square, is the first to be devoted to this romantic artist since he was shown in strength at the Victoria and Albert Museum in 1926. The present collection differs, however, from the other in that almost all these magical pictures belong to Palmer's early Shoreham period—that is, to the decade following 1825—when the artist's response to his Kentish paradise was most intense. The influence of his work of this period on the English neo-romantic school of the 1940s was pervasive—Mr. Sutherland, Mr. Piper, and the late John Minton all coming under his spell. This exhibition, accordingly, might have gained in relevance had it been held a dozen years ago; but, on the other hand, we may judge Samuel Palmer's art more dispassionately to-day, when neo-romanticism has ceased to be an active movement.

No doubt his passionate love for the immemorial tablets and liturgy of the village church inspired Palmer to create his timeless pastorals, as it also inspired Gray's elegy. Indeed, this exalted lyrical vein is a peculiarly English one. Palmer's drawings are loaded also with symbolism, taking one back, as Mr. Philip James aptly observes, to the sixty-fifth Psalm in thanksgiving for the abundance of nature. The artist's folds, likewise, are 'full of sheep', his clouds 'drop fatness', his valleys 'stand so thick with corn, that they shall laugh and sing'. Indeed, it is an enchanted land of shepherds and sheep, of apple trees, barns, moonljt hills, and banks of white clouds which is created with such incomparable richness in sepia, or black and white, that the jewelled glimmer of his painting might seem almost redundant. The dense pattern and that fleeciness which is common alike to sheep and turf and cloud combine, with the hushed mood, to place Samuel Palmer outside and above his circle of friends like John Linnell and George Richmond, admirable as they are. Here, then, is an opportunity not to be missed, for it will not soon recur, to enter his little hallowed land—

> A sort of fairy ground,
> Where suns unsetting light the sky
> And flowers and fruit abound.

The pastoral poetry of Henri-Joseph Harpignies is of a different order, and a tranquil exhibition of the French artist's work at the Marlborough Gallery reveals very often, a delicacy and understatement of contrast rather akin to the Dutch Impressionists'. In fact, Harpignies' exemplars were Corot and, to a lesser degree, Courbet whose influence is apparent in a densely encrusted painting of boulders, *Environs de Roisin*. Otherwise, the painter who was born in 1819 and died as recently

as 1916, pursued his course quite undisturbed by the movements of his time, bringing the reverence of his Barbizon vision to the wooded slopes and unruffled waters of the Loire valley, usually seen at twilight.

Two other interesting exhibitions now on view are of students' work. Down in South London, an exhibition of realist sculpture and extremely conscientious painting and drawings by students (as well as some teachers) at the Camberwell School of Art, bears witness to the sound basic training. The Principal, Mr. Leonard Daniels is, indeed, a firm believer in the principle that it is useless to attempt to fly before one has grown wings. That is not to suggest, however, that any instinctive tendency is suppressed—rather, that it is guided—and, in fact, the exhibition includes some abstract painting, though the only work of any consequence in this kind is by Mr. Terry Frost, who left Camberwell in 1950, and lectures now at Leeds University. A beneficial influence in the school is Mr. Anthony Fry's, whose reclining nude and wooded landscape are among the most sensitive of the paintings on view in the South London Gallery, Peckham Road.

In the far larger exhibition of the Young Contemporaries now at the R.B.A. Galleries, Suffolk Street, the students adopt all manner of striking attitudes whose hollowness too often becomes apparent on closer sight. Yet there is some real talent as well in this gathering of work from over fifty different schools in the country, notably from the Slade and Royal College of Art, and more particularly in landscape and interiors. The harmonious mosaic contrived by Carol Burns out of pears on a table is a delicate Slade essay, and it is a Royal Academy student, Joan Inger, who has produced a quite magical painting of boats beneath a bank at sunrise, realized with the utmost intensity. With quiet, well-planned landscapes, G. Riches and D. H. Walls have begun modestly, and therefore begun well. The graphic art here, and several pieces of sculpture, notably Astrid Zydower's lively *Children in Trafalgar Square*, also deserve attention.

NEVILE WALLIS

FACTORY EQUIPMENT EXHIBITION

The Fifth Factory Equipment Exhibition, at which much new equipment will be exhibited, will be held at Earls Court from Monday, 29th April, to Saturday, 4th May, 1957, and the organizers have extended an invitation to Fellows of the Society to visit the Exhibition free of charge. Fellows wishing to avail themselves of this offer should apply for tickets direct to the Exhibition Manager, Factory Equipment Exhibition, 4, Snow Hill, London, E.C.1, indicating the day on which they wish to attend.

JOURNAL VOLUMES SOUGHT

A library in Holland is anxious to obtain certain back volumes of the *Journal* of which the Society's own stock is exhausted. The volumes required are: 1–5, 7–8, 33–36, and 97. Fellows having any of these volumes, of which they might like to dispose, are asked to write direct to Messrs. N. V. Swets & Seitlinger, Keizersgracht 471 and 478, Amsterdam C, Holland.

OBITUARY

MR. H. L. VAN DOREN

We record with regret the death, at Bryn Mawr, Pennsylvania, on 3rd February, of Mr. H. L. Van Doren, at the age of 61.

Harold L. Van Doren, A.B., an authority on industrial design, was educated at Williams College, and studied art in New York and in Europe. He was a past president of the American Society of Industrial Artists, and was formerly art editor of the

Survey Graphic, and assistant director of the Minneapolis Institute of Arts, and had held a number of other offices.

His standard text-book *Industrial Design—A Practical Guide*, was published in 1940, and he was a frequent contributor to various magazines.

Mr. Van Doren was awarded the Italian Croce di Guerra in the First World War, and held a number of design awards. He was elected a Fellow of the Society in 1952.

MR. R. F. WILSON

It is with regret that we also record the death of Mr. R. F. Wilson, Art Director of the British Colour Council, on 10th February, 1957.

Robert Francis Wilson was born in Nottingham in 1890, and studied with great distinction at the Nottingham College of Art. After service in the First World War, he returned to the Nottingham College of Art where he taught colour and design, with special application to the training of students for industry; many of his students reached high positions as industrial designers and amongst them were winners in the Society's former Competition of Industrial Designs. This work brought him into contact with the founders of the British Colour Council, and in 1931 he was appointed its first Art Director.

In this capacity he was responsible for the inauguration of services to the colour-making and colour-using trades which now have world-wide recognition, and for the *British Colour Council Dictionary of Colour Standards* which was issued in 1934. In 1938 Mr. Wilson produced the Horticultural Colour Chart, standardizing colour terms for horticultural use and based on his own theory of colour. For this work he was awarded the Veitch Gold Medal. On the basis of these two reference works the *British Colour Council Dictionary of Colours for Interior Decoration* was produced in 1949.

Mr. Wilson was an early advocate of the need for each industry to have its own design centre, at which exhibitions could be staged showing products of the industry to the best advantage and co-ordinated with those of ancillary industries. He always emphasized the necessity of re-establishing trained artists in industry and gave evidence on this matter to the Weir Committee which recommended the setting up of the Council of Industrial Design.

During the Second World War, as a recognized authority on colour and lighting in industry, he advised on the correct use of colour and lighting in factories and offices, in order to relieve strain resulting from wartime conditions. The first edition of *Colour and Lighting in Factories and Offices* was published in 1946, after which Mr. Wilson prepared very many colour and lighting schemes for factories, offices, hospitals and laboratories. He recently wrote a book on the subject, publication of which is expected shortly.

Mr. Wilson twice read papers to the Society. In 1934 he spoke on 'Colour and Colour Nomenclature', for which paper he was awarded a Silver Medal of the Society, and in 1945 his subject was 'Colour as a Factor in Industrial Design'.

Mr. Wilson was elected a Fellow of the Society in 1930.

NOTES ON BOOKS

GEORGIAN GRACE: A SOCIAL HISTORY OF DESIGN FROM 1660–1830. *By John Gloag. A. & C. Black*, 1956. 70*s*

'How was it that architects, designers, craftsmen and their patrons never seemed to put a foot wrong in the Georgian period?' Mr. Gloag inquires at the beginning of this handsomely produced and zestfully written volume: 'What was the secret

of their capacity for good design, sense of style and impeccable judgment?' One clue is given by the frontispiece: Stubbs' painting of a phaeton, depicting a pair of thoroughbred horses drawing a vehicle perfectly designed for its purpose of moving at some 15 miles an hour and, moreover, constructed almost entirely of wood. That phaeton's attributes are apt emblems of how the eighteenth century finally perfected the 'culture techniques' inherited from the classical through the renaissance world; of the equipoise between needs and means that it attained: and of the pace which conditioned its life and work. By upsetting these basic factors the Industrial Revolution destroyed a perfect balance—another word for 'grace'—which it had taken three millennia to evolve, and may well take another to recapture.

Of the imponderables that gave the age its golden quality Mr. Gloag emphasizes its liberty, mental and economic, and its frank delight in full life (puritanism, whether Cromwellian, Victorian or modern produces vulgarity by its repressions, he maintains). Earthy-minded, rustic-hearted, even amoral, as were the Georgians, yet they implicitly observed æsthetic restraints: that discipline of the Orders which gave them not only universal rules of proportion but a universal 'language of ornament'. In a society blessed with such a scale of values, no wonder that the relation of producers and consumers so often was the ideal one of educated craftsman and enlightened patron, or that 'the sense of sight was honoured as it had not been since the age of Pericles'.

Mr. Gloag addresses himself to the non-specialist, for whom the book provides an admirable introduction to the domestic arts of the period, yet his gusto makes it just as enjoyable for the more expert. He disclaims original scholarship, yet he has assembled a mass of information from contemporary sources, much of it unfamiliar, and of which no idea can be conveyed in a short review. First, he builds up the atmosphere of the century with a wealth of allusions from letters, criticism and newspapers, and with well-chosen *genre* illustrations. Then he applies the same method to its architecture and scenery, 'ornamental conventions and waves of taste', the main categories of furniture and internal fittings, vehicles and memorials; with numerous illustrations from the leading designers and tradesmen's pattern books (admirably supplemented with special drawings by A. G. Cook and Marcelle Barton). The 48 pages of half-tone plates includes several of Sir Albert Richardson's home. A series of appendices give concise details of architects, designers and firms, typical trade advertisements, and particulars of the Society of Arts and Society of Dilettanti which exercised so profound an influence on taste.

On the other hand he does not carry analysis of such influences very far, so that, for instance, the reader is left to draw his own conclusions as to why Regency forms differed so entirely from those of Queen Anne. Since it is not Mr. Gloag's intention here to go into theoretical discussions, he scarcely notices the fundamental change between the Renaissance and the neoclassical view of 'antiquity', or the rise of that empirical spirit that, in the middle of the century, generated both the romantic and industrial revolutions. Yet it was these impulses to find new evaluations and techniques (begetting this Society in the process) that set up the tensions between art and science, sense and sensibility, in the reconciling of which Georgian 'grace' (in the sense of balanced poise) can be said to have consisted.

CHRISTOPHER HUSSEY

THE ARCHITECTURE OF SIR CHRISTOPHER WREN. *By Viktor Fürst. Lund, Humphries*, 1956. 63*s*

This presentation of the works of Sir Christopher Wren is evidence of the continued interest in the designs and influence of the great architect. With characteristic thoroughness the author has investigated every known source for his masterly com-

Survey Graphic, and assistant director of the Minneapolis Institute of Arts, and had held a number of other offices.

His standard text-book *Industrial Design—A Practical Guide*, was published in 1940, and he was a frequent contributor to various magazines.

Mr. Van Doren was awarded the Italian Croce di Guerra in the First World War, and held a number of design awards. He was elected a Fellow of the Society in 1952.

MR. R. F. WILSON

It is with regret that we also record the death of Mr. R. F. Wilson, Art Director of the British Colour Council, on 10th February, 1957.

Robert Francis Wilson was born in Nottingham in 1890, and studied with great distinction at the Nottingham College of Art. After service in the First World War, he returned to the Nottingham College of Art where he taught colour and design, with special application to the training of students for industry; many of his students reached high positions as industrial designers and amongst them were winners in the Society's former Competition of Industrial Designs. This work brought him into contact with the founders of the British Colour Council, and in 1931 he was appointed its first Art Director.

In this capacity he was responsible for the inauguration of services to the colour-making and colour-using trades which now have world-wide recognition, and for the *British Colour Council Dictionary of Colour Standards* which was issued in 1934. In 1938 Mr. Wilson produced the Horticultural Colour Chart, standardizing colour terms for horticultural use and based on his own theory of colour. For this work he was awarded the Veitch Gold Medal. On the basis of these two reference works the *British Colour Council Dictionary of Colours for Interior Decoration* was produced in 1949.

Mr. Wilson was an early advocate of the need for each industry to have its own design centre, at which exhibitions could be staged showing products of the industry to the best advantage and co-ordinated with those of ancillary industries. He always emphasized the necessity of re-establishing trained artists in industry and gave evidence on this matter to the Weir Committee which recommended the setting up of the Council of Industrial Design.

During the Second World War, as a recognized authority on colour and lighting in industry, he advised on the correct use of colour and lighting in factories and offices, in order to relieve strain resulting from wartime conditions. The first edition of *Colour and Lighting in Factories and Offices* was published in 1946, after which Mr. Wilson prepared very many colour and lighting schemes for factories, offices, hospitals and laboratories. He recently wrote a book on the subject, publication of which is expected shortly.

Mr. Wilson twice read papers to the Society. In 1934 he spoke on 'Colour and Colour Nomenclature', for which paper he was awarded a Silver Medal of the Society, and in 1945 his subject was 'Colour as a Factor in Industrial Design'.

Mr. Wilson was elected a Fellow of the Society in 1930.

NOTES ON BOOKS

GEORGIAN GRACE: A SOCIAL HISTORY OF DESIGN FROM 1660–1830. *By John Gloag. A. & C. Black*, 1956. 70*s*

'How was it that architects, designers, craftsmen and their patrons never seemed to put a foot wrong in the Georgian period?' Mr. Gloag inquires at the beginning of this handsomely produced and zestfully written volume: 'What was the secret

of their capacity for good design, sense of style and impeccable judgment?' One clue is given by the frontispiece: Stubbs' painting of a phaeton, depicting a pair of thoroughbred horses drawing a vehicle perfectly designed for its purpose of moving at some 15 miles an hour and, moreover, constructed almost entirely of wood. That phaeton's attributes are apt emblems of how the eighteenth century finally perfected the 'culture techniques' inherited from the classical through the renaissance world; of the equipoise between needs and means that it attained: and of the pace which conditioned its life and work. By upsetting these basic factors the Industrial Revolution destroyed a perfect balance—another word for 'grace'—which it had taken three millennia to evolve, and may well take another to recapture.

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Mr. Gloag addresses himself to the non-specialist, for whom the book provides an admirable introduction to the domestic arts of the period, yet his gusto makes it just as enjoyable for the more expert. He disclaims original scholarship, yet he has assembled a mass of information from contemporary sources, much of it unfamiliar, and of which no idea can be conveyed in a short review. First, he builds up the atmosphere of the century with a wealth of allusions from letters, criticism and newspapers, and with well-chosen *genre* illustrations. Then he applies the same method to its architecture and scenery, 'ornamental conventions and waves of taste', the main categories of furniture and internal fittings, vehicles and memorials; with numerous illustrations from the leading designers and tradesmen's pattern books (admirably supplemented with special drawings by A. G. Cook and Marcelle Barton). The 48 pages of half-tone plates includes several of Sir Albert Richardson's home. A series of appendices give concise details of architects, designers and firms, typical trade advertisements, and particulars of the Society of Arts and Society of Dilettanti which exercised so profound an influence on taste.

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pilation, in fact, a work of this type would have been impossible but for two centuries of evidence which has been amplified by many writers down to recent times.

As Carlyle observed, it is not what an author carries in his head but what he has in his library that really matters. The tendency to-day is to accumulate facts and to attempt to demonstrate truths by re-stating hypothetical theories which may or may not have been followed by designers in the past. It is obvious to most thinkers that Wren's manner formed part of the great culminating movement of the Italian Renaissance which found its truest expression in France in the late seventeenth century. Wren's remarkable genius was expressed in using all available information in the form of engravings of buildings then standing in divers European countries. It has been possible to trace the exact origin of many of Wren's designs and to follow their transmutation under the pencil of the master. This applies to the original design for the plan of St. Paul's, the very basis of all Wren's subsequent works. Not only has Mr. Viktor Fürst had recourse to the Wren Society's publications but he has followed every recorded architectural contribution on the subject.

To-day architects are becoming more interested in the pictorial aspect of historical buildings, regarding them to be the foremost expressions of the visual arts. The author in this case has presented information on a great scale for the student to digest, in other words Mr. Viktor Fürst has prepared a feast but has omitted to state how it might be enjoyed. Those to whom the Renaissance in England has become a passionate study spare no pains to appreciate the why and the wherefore of certain aspects of design. This Mr. Viktor Fürst has not thought essential and in this inhere the shortcomings of his otherwise most useful contribution.

A. E. RICHARDSON

THE NUDE. *By Sir Kenneth Clark. John Murray*, 1956. 63*s*

THE ART OF SCULPTURE. *By Sir Herbert Read. Faber*, 1956. 52*s* 6*d*

Of these imposing volumes, that of Sir Kenneth Clark is the more important. He deals with a particular aspect which sweeps wide; his conclusions ring true; his prose is a model of clarity and the practical needs of a text-book are met by conveniently dispersing the 298 excellent illustrations.

In contrast, Sir Herbert Read is disappointing. Certainly his more sumptuous book concentrates a magnificent collection of over 200 large-scale plates, and the technical production and typography could hardly be bettered. But his prose is at times so loaded with words that his meaning is hard to extract.

He has acceptable passages referring to the immense importance of technique, but when he illustrates six examples, widely separated in time, of what he rightly regards as the 'touchstone' of sculpture, he could usefully have explained that the rich element common to them all is due fundamentally to the technique of abrasion and is not present in works made purely by cutting or modelling. He is at pains to account for qualities in early statuettes and amulets which, to a carver, appear little more than the comparable results that would be attained to-day by intelligent handymen endeavouring with files to shape small figures out of slips of marble.

Throughout he appears to build up a case to support his championship of a limited field of modern sculpture, but when he reaches this aspect his exposition is unconvincing. 'At this point' he says, 'a new art is born: a negative sculpture, a sculpture that denies the basic elements of the art of sculpture as we have hitherto conceived it, a sculpture that rejects all the attributes of palpable mass'! Well, well; perhaps that is why he illustrates among the world's masterpieces the winning design for the *Unknown Political Prisoner*, which is now but the memorial of a noble and munificently endowed intention that died in a gale of guffaws. Sculpture is a stern master.

Sir Herbert seems to deny the full value of humanism in art, but Sir Kenneth

stresses that it is the reflection of human need and experience which gives to it vitality; and truly, is it not this element, arising from a vital necessity, that we find for example in the axe-heads of the Stone Age and which is so lacking in the arbitrary monoliths of to-day?

Although experienced artists may think that the repetition at long intervals of time of certain postures is due more to the limitations of human movement than to the conscious copying by succeeding generations which the author suggests, Sir Kenneth's chapter on Energy which is first seen in a 'few wretched puppets at Lascaux', is thrilling. But Sir Herbert contrariwise holds up for our approval similar modern puppets which any tyro with a sense of movement and balance, some wire and icing-sugar, could produce! That one of these, enlarged to six feet without addition to content or form, should have been bought by the nation and placed among the art treasures of the Tate, evokes from him no protest, which is unfortunate at a time when the training of young sculptors leaves so much to be desired.*

Sir Herbert includes in his survey 'constructions' and 'mobiles'. To call these sculpture is a mis-use of the name, but they may well merit another honourable term. If so, are not the true masters of this new art the engineers of applied science? Is not the air alive with beautiful mobiles, and are there not to be found among the oil-cracking plants and power stations impressive constructions having the vitality of function which promotes growth?

Moreover, *The Art of Sculpture* is regrettably silent on the important renaissance, since the nadir of the last century, of the traditional sculpture of western civilization. There is mention, for instance, neither of Epstein nor Carl Milles. Surely it is reasonable to believe that the virile bronzes of the former and the mighty works in Scandinavia and the United States of the latter merit, with others, a claim for consideration of their present influence on the art and, even perhaps future immortality? This book is weakened by so sweeping an omission.

But Sir Kenneth can be enjoyed with confidence and profit. Starting with the premise that the nude is, not a subject, but a form of art 'invented by the Greeks in the fifth century B.C.' he traces the gradual perfecting of the shapes of Apollo and Venus, in which their worshippers saw themselves mirrored as gods. When, after centuries of neglect for various reasons, the nude reappeared in the Middle Ages, an 'alternative convention' evolved a new set of values. These in turn yielded to the Renaissance revival of the Greek concept which has survived until recently when, if his few examples from a restricted field really represent modern trends, the nude is having rather an unappreciated experience! Beside that on Energy, already mentioned, he has other chapters entitled Pathos and Ecstasy which add further lustre to his achievement.

Readers may feel that both authors are unduly conscious of only one aspect of contemporary art and that their illustrations tend to confirm the impression that such work reaches its zenith when, like that of the Old Masters', it is intelligible to the wider audience.

C. d'O. PILKINGTON JACKSON

READINGS IN MARKET RESEARCH. *The British Market Research Bureau Ltd.*, 1956. 35*s*

This collection of papers on market research in Britain is a most welcome addition to the scanty literature which exists on this subject. Workers in market research in this country are conscious of the lack of adequate opportunities for discussing their techniques and experiences with their colleagues. The editors mention that there are eight independent large-scale research organizations operating in Britain and the fact that this book contains papers from only two of these is an indicator of this

* See paper and discussion on 'Commissioning of Works of Art' by Louis Osman in the *Journal* for 7th December, 1956.

atmosphere of secrecy. Happily this deficiency is more than made up by the excellent contributions from the Government Social Survey, the B.B.C. and the Oxford Institute of Statistics—together with those from the two commercial organizations which have contributed.

It is disappointing to read that the authors have been denied access to papers which they wished to include; this may be the explanation of the absence from this book of any of the papers which have been published by the Division of Research Techniques of the London School of Economics.

In an anthology of this type the case-history plays an important part. Mr. H. F. Lydall's 'The Methods of the Saving Survey' is an impressive contribution in that it outlines the formidable difficulties faced in this type of investigation, and describes the painstaking and careful methods which were employed to overcome them. However, this operation is not typical of the large mass of market research being carried out every day and to give the reader an appreciation of the scope and impact of this everyday work the authors have selected Mr. Louis Moss' 'Sample Surveys and the Administrative Process'. This article gives examples of the widespread help to administration provided by the Government Social Survey, together with the important financial savings it has secured. Naturally this had to be dealt with in summary fashion (it is not the less readable for that) and it would have added to the value of this volume had one of these examples been treated in detail to provide another case-history. The stimulating description of the 'Demand for Campaign Stars and Medals' might well have been included in place of one of the papers which have been selected.

Many researchers consider that in the sample survey the problems of sample design have been largely solved and that more, much more, attention should be paid to the interview. The penetrating and thoughtful article 'Interviewers and Interviewing', by J. E. Fothergill and H. D. Willcock, shows that these two authors, at least, are alert to the manifold problems in the interview situation. (A faint note of protest here against the 'mandarin' style employed by the authors). Few questionnaires, one feels, would not benefit from a scrutiny by these two writers.

There is an illuminating article by Mr. R. N. Wadsworth in which, as a user of market research, he advises on how to select the most appropriate techniques and how to make the best use of them.

This book will inform and assist those interested in market research techniques. The editors are to be congratulated on producing it and on the discrimination they have shown in selecting material of such even, high quality.

D. A. BROWN

SHORT NOTES ON OTHER BOOKS

WHO'S WHO IN ART. *Art Trade Press*, 1956. 60*s*

Compiled from information provided by the artists themselves, the eighth edition of *Who's Who in Art* contains over 4,000 names and 600 signatures; it thus exceeds the seventh edition which appeared in 1954, and is revised and reset. Apart from the biographical data on British artists in this country and the Commonwealth, a selection of foreign artists is included, from many countries. An obituary section is appended containing the names of some artists whose deaths have been reported since the fifth edition closed for press.

CHILD PORTRAITURE FROM BELLINI TO CÉZANNE. *By F. M. Godfrey. Studio*, 1956. 42*s*

A recent exhibition of Dutch child portraits showed the great charm of this branch of painting and in this book the reader can follow the development of the art from 96 examples of child portraiture ranging over six centuries and diverse schools of painting. There is a general introduction, followed by notes on each plate.

SCIENCE AND THE HUMANITIES. *By Gavin de Beer. London, H. K. Lewis & Co., Ltd., 1956. 2s 6d*

Sir Gavin de Beer's Rickman Godlee Lecture, delivered at University College, London, in October, 1956, is here republished. In tracing the widening gap between the humanities and sciences to its present extreme, he described the different intellectual climate in which a Voltaire, or a Dr. Johnson, could pursue his interest in both fields. Early specialization to-day makes such wide range impossible, but it is suggested that one possibility is the use of scientific methods to solve problems within the sphere of the humanities, and Sir Gavin quotes as examples Hannibal's winter crossing of the Alps, and the origins of the Etruscans.

FROM THE JOURNAL OF 1857

VOLUME V. *27th February*, 1857

NEED FOR EXTENSION OF PREMISES

From a report of a Conversazione

The first Conversazione of the present Session was held on Saturday evening last, when the attendance was unusually large. All the rooms were thrown open, and contained a fine collection of objects of interest.

In the lower rooms were arranged numerous specimens of Art-manufacture in enamel, gem work, gold and silver plate, bronzes, electro deposits, stained glass, fictile wares, tapestry, etc. . . .

In the suite of rooms on the first floor, were exhibited a fine collection of water-colour drawings, by Turner, J. D. Harding, Cattermole, Corbould, Stanfield, Danby, Warren, De Wint, Cox, and other eminent artists, as well as photographs, of unusual size, by Bissom *freres*, Baldus, and other distinguished French photographers. On the tables were displayed several sets of philosophical apparatus, optical instruments, etc. . . .

The only hindrance to a full examination of the numerous objects collected for the entertainment of the company, was the over-crowded state of the rooms. Several applications have been made by members, since the Conversazione, for an opportunity of studying the collections, but owing to the necessity of re-arranging the room for the Society's meetings, it has been impossible to comply with the requests made. This is, however, much regretted, and leads the Council to hope that the members will be induced to join with them in making a speedy and vigorous effort to obtain for the Society that enlarged accommodation which its constantly increasing numbers and the importance of its objects render so imperatively necessary.

Some Activities of Other Societies and Organizations

MEETINGS

SAT. 2 MAR. Horniman Museum, London Road, S.E.23. 3.30 p.m. Mrs. E. Ettlinger : *Celtic folklore and scenery.*

MON. 4 MAR. Electrical Engineers, Institution of, Savoy Place, W.C.2. 5 p.m. D. C. Espley : *Electronics in administration—a survey.*

Engineers, Society of, at Burlington House, W.1. 5.30 p.m. The Rt. Hon. Lord Ventry : *Airships and balloons.*

Geographical Society, Royal, Kensington Gore, S.W.7. 6 p.m. J. E. B. Hill : *New China* 1956.

Imperial Institute, S.W.7. 5.45 p.m. Miss G. M. Ashby : *Man on the spot—Fiji.*

Road Transport Engineers, Institute of, (1) at the Institution of Engineers and Shipbuilders, Elmbank Crescent, Glasgow. 7.30 p.m. A. S. C. Marks : *The design and construction of a modern goods-carrying vehicle ;* (2) at the Victoria and Station Hotel, Preston. 7.30 p.m. E. N. Farrar : *Two-way radio as an aid to the control of goods and passenger vehicles.*

TUES. 5 MAR. British Architects, Royal Institute of, 66 Portland Place, W.1. 6 p.m. G. A. Jellicoe : *Building in the landscape.*

Chemical Engineers, Institute of, at Burlington House W.1. 5.30 p.m. S. R. Tailby, M. D. Ashton, and I. Berkovitch : *Radiation from luminous town's gas flames.*

Metals, Institute of, at the Cadena Café, Cornmarket Street, Oxford. 7 p.m. Dr. W. Hume-Rothery : *The writing of scientific papers.*

Textile Institute, at the College of Further Education, Hinckley, Leics. 7.15 p.m. E. Millson Walker : *The textile technologist or chemist at work.*

WED. 6 MAR. Engineers, Junior Institution of, at the James Watt Memorial Institute, Great Charles Street, Birmingham. 7 p.m. B. Donkin : *Fuel economy and heat-electric generation.*

Health, Royal Society of, 90 Buckingham Palace Road, S.W.1. 2.30 p.m. Dr. A. C. Frazer and Dr. H. Sinclair : *The composition and nutritive value of flour.*

Kinematograph Society, British, at the Royal Society of Arts, W.C.2. 7.15 p.m. G. J. Craig : *16mm. colour films.*

Petroleum, Institute of, 26 Portland Place, W.1. 5.30 p.m. H. R. Warman and Dr. A. T. Dennison : *Trends in exploration methods.*

Photographic Society, Royal, 16 Princes Gate, S.W.7. 7 p.m. A. F. T. Rowley : *The pictorial landscapes of Mrs. K. M. Parsons.*

Radio Engineers, British Institution of, at the Chamber of Commerce, 1 Old Hall Street, Liverpool, 3. 7 p.m. E. A. W. Spreadbury : *The preparation of service and technical data sheets.*

Road Transport Engineers, Institute of, at the Mechanic's Institute, Nottingham. 7.30 p.m. J. Hobbs : *The development of the Hobbs transmission gear.*

Victoria & Albert Museum, S.W.7. 6.15 p.m. A. Clifton-Taylor : *The great American art collections—1.*

William Morris Society, at the Art Workers' Guild, 6 Queen Square, W.C.1. 7.30 p.m. A. Fairbank : *The manuscript work of William Morris.*

THURS. 7 MAR. Anthropological Institute, Royal, 21 Bedford Square, W.C.1. 5.30 p.m. Dr. F. Girling : *Joking relationships in a Scottish town.*

Electrical Engineers, Institution of, Savoy Place, W.C.2. L. B. Hobgen, K. A. Spencer, and P. W. Heselgrave : *Cathodic protection.*

Engineering Designers, Institution of, 38 Portland Place, W.1. 6.45 p.m. O. S. Puckle : *The electronic control of machine tools.*

Metallurgical Society, at the University, Leeds 2. 7.15 p.m. J. B. P. Williamson : *The study of wear and lubrication using radio-isotopes.*

Metals, Institute of, 17 Belgrave Square, S.W.1. 6.30 p.m. Dr. C. E. Ransley : *Gas in light alloys.*

Physical Society, at the Royal School of Mines, South Kensington, S.W.7. 4 p.m. Dr. J. M. Lock : *The magnetic properties of the rare earth metals at low temperature.*

Radio Engineers, British Institution of, at the College of Technology, Sackville Street, Manchester 1. 6.30 p.m. A. Douglas : *Electronic musical instruments.*

Refrigeration, Institute of, at 14 Rochester Row, S.W.1. 5.30 p.m. D. H. Powell : *Automatic control systems for refrigerating plant in air conditioning.*

Road Transport Engineers, Institute of, at the Royal Hotel, Bristol. 7.30 p.m. G. H. I. List : *Wheel alignment in relation to tyre and vehicle performance.*

Textile Institute, at 10 Blackfriars Street, Manchester 3. 7 p.m. G. R. Perdue : *Some aspects of laundering.*

FRI. 8 MAR. Engineers, Junior Institution of, 14 Rochester Row, S.W.1. 7 p.m. A. H. Waddington: *The treatment of effluents.*

Road Transport Engineers, Institute of, at the South Wales Institute of Engineers, Park Place, Cardiff. 7 p.m. W. A. Snell and T. I. Fowle : *From the laboratory to the road.*

Royal Institution, 21 Albemarle Street, W.1. 9 p.m. Sir B. Lockspeiser: *European organization for nuclear research.*

SAT. 9 MAR. Horniman Museum, London Road, S.E.23. 3.30 p.m. Dr. J. Kunst : *Music of Africa.*

MON. 11 MAR. Chemical Engineering, at 14 Belgrave Square, S W 1. 5.30 p.m. A. P. Hosking and K. C. Salter : *A survey of industrial filtration.*

Electrical Association for Women, at the Institution of Electrical Engineers, Savoy Place, W.C.2. 6 p.m. Miss P. E. Grady : *Electricity and the Swedish way of life.*

Engineers, Junior Institution, (1) at Livesey Clegg House, Sheffield. 7.30 p.m. F. A. Hurst : *Reflections of 40 years in the steel industry ;* (2) at the Engineers' Club, Albert Square, Manchester 7.30 p.m. *Film Evening.*

Imperial Institute, S.W.7. 5.45 p.m. J. B. Odunton : *Man on the spot—Gold Coast.*

Metals, Institute of, at the Institution of Engineers and Shipbuilders, 39 Elmbank Crescent, Glasgow, C.2. 6.30 p.m. Dr. J. C. Chaston : *Production and uses of rare metals.*

Road Transport Engineers, Institute of, at Houldsworth Hall, 90 Deansgate, Manchester. 7.30 p.m. J N Morris : *Petrol injection.*

Transport, Institute of, at 66 Portland Place, W.1. 5.45 p.m. A. A. Harrison : *Railway freight charges.*

TUES. 12 MAR. Mechanical Engineers, Institution of, 1 Birdcage Walk, S.W.1. 6 p.m. W. G. Wilson: *Transmission developments for public service and heavy goods vehicles.*

Metals, Institute of, at the University Collete, Singleton Park, Swansea. 6.45 p.m. Professor A. R. E. Singer : *Clad metals.*

Road Transport Engineers, Institute of, at the Engineering Centre, Stephenson Place, Birmingham. 7.30 p.m. P. A. Phillips : *Gas turbine development for road transport.*

WED. 13 MAR. Archaeological Institute, Royal, at Burlington House, W.1. 5 p.m. G. C. Boon : *Excavations at Silchester 1954–1956.*

Engineering Inspection, Institution of, at the Royal Society of Arts, W.C.2. 6.45 p.m. H. A. Tozer : *Inspection, administration and procedure in the aircraft industry*

Folk-lore Society, at the University College, Gower Street, W.C.1. 7.30 p.m. Miss S. R. Burstein : *George Laurence Gomme and the science of folklore.*

Fuel, Institute of, at the Institution of Civil Engineers, Great George Street, S W 1 5.30 p.m. M. V. Murray : *The work of B.C.U.R.A. on the coking stoker.*

Health, Royal Society of, 90 Buckingham Palace Road, S.W.1. 2.30 p.m. A. E. J. Petter : *The treatment of trade effluents ; a general survey.*

Photographic Society, Royal, 16 Princes Gate, S.W.7. 7 p.m. J. Rufus : *Architectural photography with a miniature camera.*

Victoria & Albert Museum, S.W.7. 6.15 p.m. A. Clifton-Taylor : *The great American art collections—11.*

THURS. 14 MAR. Building Centre, 26 Store Street, W.C.1. 6 p.m. T. Mitchell and A. Grayson : *Asbestos cement goods.*

Chemical Engineers, Institute of, at the College of Technology, Manchester. 7 p.m. J. R. Grover : *Disposal of long-lived fission products.*

Chemical Society, at the Royal Institution, Albemarle Stroet, W.1. 7.30 p.m. Professor H. C. Urey : *Chemical problems relating to the origin of the earth.*

Kinematograph Society, British, at the Royal Society of Arts, W.C.2. 7.30 p.m. B. Honri : *Milestones in studio technique.*

FRI. 15 MAR. Sound Recording Association, British, at the Royal Society of Arts, W.C.2. 7.15 p.m. D. M. Leakey : *Ultra linear amplifiers.*

OTHER ACTIVITIES

NOW UNTIL 23 MAR. Arts Council Gallery, 4 St. James's Square, S.W.1. Exhibitions : *Indian painting from Rajasthan ; and Samuel Palmer & his circle.*

NOW UNTIL 23 MAR. British Architects, Royal Institute of, 66 Portland Place, W.1. Exhibition : *Nouveau visage de la France—architecture et grands travaux.*

WED. 13 and THURS. 14 MAR. Oil and Colour Chemists' Association, at the Royal Horticultural Society, Greycoat and Elverton Streets, S.W.1. 10 a.m. Exhibition : *Raw materials and equipment used in the paint, varnish and printing ink industries.*